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# Preparing for Medical School Admissions Through Professional Competency Education in a Healthcare Pipeline Program

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PREPARING FOR MEDICAL SCHOOL ADMISSIONS  
THROUGH PROFESSIONAL COMPETENCY EDUCATION  
IN A HEALTHCARE PIPELINE PROGRAM

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A Dissertation  
Presented to  
the Graduate School of  
Clemson University

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In Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Philosophy  
Educational Leadership

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by  
Cindy Nessim Youssef Riyad  
August 2019

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Accepted by:  
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## ABSTRACT

Using a conceptual framework concerning core competencies for entering medical students, the researcher examined how the core competencies were displayed in the medical school applications for students who completed a healthcare pipeline program. The researcher completed a descriptive qualitative study and examined medical school application materials that were submitted by applicants and external individuals. The researcher used framework analysis to understand how the competencies were displayed within the admissions materials. The researcher examined personal statements, letters of recommendation, secondary applications, individual interview comments, and multiple mini interview comments.

After completing framework analysis, the results indicated a strong presence of core competencies within the letters of recommendation and personal statement data materials. Core competencies observed included critical thinking, oral communication, resilience and adaptability, reliability and dependability, social skills, cultural competence, and capacity for improvement. Key themes emerged from the presence of the core competencies: academic performance and excellence, connecting through communication skills, fostering relationships through service and leadership, and personal experiences in medicine. Of the three themes, connecting through communication skills contained the most core competencies and served as a connector between the other three themes.

The examination of application materials submitted by applicants and external individuals provided greater insight into the core competencies exhibited in the medical

school admissions process. This research study established a baseline for future research studies. More in-depth study is needed to determine whether the presence of core competencies may affect admissions decisions or success in medical school.

## DEDICATION

This dissertation is dedicated to the two most hardworking, determined, and loving people I know: Drs. Nessim and Sonia Youssef. You left the comfort of your lives in Egypt to provide my siblings and me with an environment full of freedom and encouragement to achieve our dreams. Your resilience throughout the re-establishment of your medical careers in the United States instilled a passion in me to continue my education until I reached the pinnacle. When I veered off the beaten path of “Youssefs in medicine,” you motivated me to go along a journey towards my own success. Thank you for always helping me to make my dreams a reality. I love you, dad and mom.

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## **CHAPTER ONE**

### **INTRODUCTION**

The steady increase of students applying for medical school throughout the past ten years furthers the notion that students desire careers in which they can directly improve the quality of life for others and enhance the patient experience (Weiss & Swede, 2019; Manary, Boulding, Staelin, & Glickman, 2013; Lu, Barriball, Zhang, & While, 2012; McManus, Livingston, & Katona, 2006). A study conducted by McHarg, Mattick, and Knight (2007) highlighted three key motivations for students to pursue a career as a physician: (1) early exposure to the medical field through personal or familial experiences/physician encounters; (2) the ability for the student to prove individuals wrong in assuming a student would not become a competitive physician; and (3) a strong support system which not only supported, but encouraged students to pursue a career as a physician. As the competitiveness of the medical school admissions process continues to increase, there is a need for students to further define themselves as viable and worthy candidates of medical school (Kreiter & Axelson, 2013; Albanese, Snow, Skochelak, Huggett, & Farrell, 2003). Entities such as the American Medical Association (AMA) and the Association of American Medical Colleges (AAMC) have developed and circulated tools to further define and demystify the medical school applications process for students, while also connecting them to opportunities to strengthen their applications and become viable, competitive applicants (Association of American Medical Colleges, 2019e; Association of American Medical Colleges, 2019f).



There are several components to the admissions process, including the application, the interview, and the external references provided on behalf of the applicant (Association of American Medical Colleges, 2019e; Monroe, Quinn, Samuelson, Dunleavy, & Dowd, 2013, Association of American Medical Colleges, 2013; Dixon, 2012; Eva, Rosenfeld, Reiter, & Norman, 2004). Prior research studies have focused on particular aspects of the admissions process and whether the various components submitted to the admissions committee have resulted in success in medical school (measured by statistical scores on medical school course examinations) (Monroe et al., 2013; Basco, 2002). The literature indicates a shift from prior years where greater emphasis was given towards students' academic metrics (test scores and grades) towards examination of the applicant on the basis of their academic metrics, in addition to their experiences, their skills, and their attributes (Association of American Medical Colleges, 2019b; Association of American Medical Colleges, 2019e; Association of American Medical Colleges, 2019f; Albanese et al., 2003; Carrothers, Gregory, & Gallagher, 2000).

Medical school admissions evolved from educating medical students to provide care focused solely on the patient and his symptoms to incorporating patient-centered care that accounts for symptoms and the environment in which the patient resides (LaNoue & Roter, 2018). The shift from statistical to holistic admissions was in part due to the evolving method to train physicians, from strictly an "accumulation of facts...toward the development of core professional competencies," which include the way students will care for patients, communicate with one another, and collaborate across other professions in healthcare (Kirch, 2017, para. 4). As an administrator functioning in

several branches of medical education, the purpose of conducting this research study was to understand whether the guidelines outlined by the Association of American Medical Colleges (AAMC) are utilized and are evident in the admissions process of students who have received targeted and specialized training on the guidelines, known as core competencies for entering medical students (Association of American Medical Colleges, 2019b).

In this chapter, I provide an overview of the research study, beginning with the background of the study and its significance, a statement of the problem, and the purpose of the research study. I provide a brief discussion on the theoretical framework of Sternberg's (2007) intelligence theory and the conceptual framework known as the AAMC Experiences-Attributes-Metrics model (Association of American Medical Colleges, 2013). I give a brief overview of each theory and how they guide my study. Then I present the research question, provide an overview of the methodological approach taken, explain the significance of the study, share my assumptions as a researcher, and present my positionality statement. This section ends with defined key terms utilized throughout this research study.

### **Background of the Study**

Medical schools in the United States (US) can be traced back as far as the late 1700s, to a time when US independence also signified the growing need for independence from the reliance on European physicians and medical professionals (U.S. Department of Health, Education, and Welfare, no date). With the establishment of the first medical school in the country in 1765, medical colleges further developed

throughout the country into the nineteenth century. By the early 1900s, there were 131 medical schools established throughout the US (Liaison Committee on Medical Education, 2006; Cooke, Irby, Sullivan, & Ludmerer, 2006). A 1910 survey on the state of medical education in the United States, published by Abraham Flexner, resulted in major reform of medical education and even forced the closure of over 45 medical schools and programs, which could not deliver the caliber of medical education needed at the time (U.S. Department of Health, Education, & Welfare, no date). Since Flexner's report, important changes have been made to medical education, including greater federal funding, increased rigor of the medical school curriculum, and deepening involvement in research endeavors and initiatives (Cooke, Irby, Sullivan, & Ludmerer, 2006).

Currently, the United States has a total of 154 accredited allopathic medical schools in the United States which grant the Doctor of Medicine (MD) degree (Association of American Medical Colleges, 2019d), and 35 accredited osteopathic medical schools which grant the Doctor of Osteopathy (DO) degrees (American Association of Colleges of Osteopathic Medicine, 2019b, para. 2). The accreditation process has ensured that the medical schools established in the early 20th century continue to “meet national standards of educational quality” which are explained in great detail by the Liaison Committee on Medical Education (LCME) (2006). The table below highlights the evolution of the number of applicants to accredited medical schools between the 2007-2008 academic year and the 2017-2018 academic year, which displays the ongoing competitiveness of medical schools throughout the country (Association of American Medical Colleges, 2018a).

Table 1.1

*Admissions Data Comparison Between 2007 Admissions Cycle and 2017 Admissions  
Cycle for Allopathic and Osteopathic Medical Schools*

Metrics	Allopathic Medical School (MD)			Osteopathic Medical School (DO)		
	2007-2008	2017-2018	% Increase	2007-2008	2017-2018	% Increase
# Applicants	42,315	51,680	22.1%	11,231	20,836	85.5%
First-year enrollment	17,759	21,338	20.2%	4,528	8,088	78.6%
Total enrollment	77,370	89,789	16.1%	15,634	28,981	85.4%
Total graduates	16,466	19,553	18.7%	3,000	6,015	>100%

*Note:* Data for this table was compiled from Association of American Medical Colleges (2018a) and American Association of Colleges of Osteopathic Medicine (2019g).

Despite the growing number of applicants to medical schools each year, researchers have indicated a growing shortage of physicians in the United States (Association of American Medical Colleges, 2017; Gudbranson, Glickman, & Emanuel, 2017; Cooper, 2003). A report published by the Association of American Medical Colleges (AAMC) in 2017 highlighted the facts and figures regarding an aging medical physician population, the increased demand for medical services in areas physicians are not serving, and the growing need for positions in residency programs, as medical students are graduating but not able to match into a residency program (IHS Markit, 2018). To combat the physician shortage which continues to grow, there has been a

recent increase in the number of new, “public, community-based” medical schools opening throughout the country (Liaison Committee on Medical Education, 2006, p. 2).

In addition to the influx of additional medical schools opening, the nature of medical education evolved to incorporate a curriculum which addresses the evolution of medical students treating various patient populations (LaNoue & Roter, 2018; Koh, Khoo, Wong, & Koh, 2008). The incorporation of various technology methods to deliver patient care were implemented in the medical school classroom and the community. The delivery of medicine became more robust throughout the years, evolving from physicians personally making house visits to now using telemedicine to deliver care to patients who are underserved and who live far from a healthcare delivery entity (Kirch & Patelle, 2017).

Kirch (2017) noted that despite these advancements and the use of technology in medicine, “a computer cannot replace a human being when it comes to the empathic communication required for effective care and shared decision making” (p. 1947). The competitiveness of medical schools, coupled with the advancements in the medical school curriculum, has driven the need to reform and redefine the medical school admissions process, in order to find the students who embody the skills, characteristics, and attributes – the competencies – of the future physician workforce (Koenig, Parrish, Terregino, Williams, Dunleavy, & Volsch, 2013).

### **Statement of the Problem**

Prior literature on medical school admissions focused on quantitative factors, such as grade point average (GPA) and scores from the medical college admissions test

(MCAT), as vehicles for gaining admissions into medical school (Gay, Santen, Magrulkar, Sisson, Ross, & Bibler Zaidi, 2018; Kreiter & Axelson, 2013; Donnon, Paolucci, & Violato, 2007; Basco, 2002). Over the years, however, medical schools have shifted focus from a statistical view to a holistic approach in their admissions process (Association of American Medical Colleges, 2013). The holistic admissions process evaluates an applicant beyond statistical scores reported in the application. Instead, the holistic admissions process places a greater emphasis on understanding what skills and readiness characteristics students display in their application materials (Koenig, et al., 2013; Conrad, Addams, & Young, 2016).

With a growing number of students applying to medical school and a stagnant number of medical school spots available annually (Association of American Medical Colleges, 2019g), applicants are seeking ways to differentiate themselves from their peers. As evidenced in the Association of American Medical Colleges (AAMC)'s Core Competencies for Entering Medical Students (Association of Academic Medical Colleges, 2019), career readiness/professionalism skills are important components in the admissions process (Monroe, Quinn, Samuelson, Dunleavy, & Dowd, 2013). Students who participate in medical school preparation experiences or programs are given greater access to understanding and succeeding in the medical school admissions process (Reeves, Vishwanatha, Yorio, Budd, & Sheedlo, 2008; Thames, 2014).

### **Purpose of the Study**

The purpose of this study was to understand the presence of core competencies displayed in the admissions materials of students applying for medical school who have

already completed the final year of a healthcare pipeline program. To study this purpose, I examined factors affecting the admissions process of medical schools. Factors including the stagnant number of open seats available at current medical schools, the increased number of students interested in pursuing a medical career, and the slow process of creating new medical schools to fill this need are important points to consider when examining medical school admissions (IHS Markit, 2018; Liaison Committee for Medical Education, 2006).

Coupled with these factors is the need to understand how application materials submitted by students display the characteristics admissions committees are looking for when making their admissions decisions (Petty, Metzl, & Keeys, 2017; Albanese, et al., 2013; Lievens, 2013; Eva, et al., 2004; Carrothers, et al., 2000). These characteristics, known as core competencies, were identified by the Association of American Medical Colleges (AAMC) as attributes and skills needed for entering medical school (Association of American Medical Colleges, 2019b). This study examined how students who have completed a healthcare pipeline program displayed core competencies in their medical school admissions application materials.

### **Conceptual Framework**

To understand the use of core competencies within the medical school admissions process, I used the following for my conceptual framework: (1) Sternberg's Triarchic Theory of Intelligence (1984) and (2) the Experiences-Attributes-Metrics Model from the Association of American Medical Colleges (2013). Both theories provide a framework

for the medical school admissions process. I provide a brief overview of each theory and its components below.

### **Sternberg's Triarchic Theory of Intelligence**

This research study focused on the theoretical framework outlined by Sternberg, known as Sternberg's Triarchic Theory of Intelligence (1984). This theory focused on the notion that students who experience failure may do so because of "teaching and assessments that are narrow in conceptualization and rigid in implementation" (Sternberg, 2007, p. S105). In other words, Sternberg (2007) argued the variability in levels of intelligence and the lack of variability in the teaching and assessments students complete while in school. Sternberg (2007) defined successful intelligence in the following ways: (1) using a skillset of abilities that the individual defines based on his or her sociocultural environment; (2) having an awareness of strengths and weaknesses and understanding how to adjust life choices because of these strengths and weaknesses; (3) making adaptations and changes to the environment through the "balanced use" of analytical, creative, and practical abilities that one recognizes in his life (Sternberg, 1984; Sternberg, 2007, p. S105).

Sternberg (2007) argued that the critical connecting thread between the analytical, creative, and practical abilities one possessed is knowledge, which can be readily applied when needed. His argument also highlighted the notion that balance is needed among the three abilities, however those who are successfully intelligent recognized the three abilities may not be equal but can work symbiotically in one's life and balance the individual. Sternberg's (2007) theory has been significant to research on school



admissions, due to its premise that intelligence is not measured solely based on test scores alone, but rather using the traditional testing scores, as well as examining the abilities of the applicants in the admissions process (Sternberg, 1984; Sternberg & The Rainbow Project Collaborators, 2006).

### **AAMC Experiences-Attributes-Metrics Model**

Launched in 2007, the Association of American Medical Colleges (AAMC) introduced the Holistic Review Project, which was an initiative focused on addressing the evolution of the medical school admissions process beyond a focus on statistical admissions parameters only (Association of American Medical Colleges, 2013). Central to the premise of holistic admissions is a structure introduced by the AAMC known as the AAMC Experience-Attributes-Metrics Model (Association of American Medical Colleges, 2013). This model is characterized to include “consideration of many dimensions of applicants, broadening the context in which their development, accomplishments, and potential can be evaluated” (Witzburg & Sondheimer, 2013, p. 1566).

At the center of the model is a focus on metrics, which includes course grades, standardized test scores, and grade point averages. The second layer addresses attributes, or characteristics of applicants which define who they are or the backgrounds they represent. The final layer is related to experiences that applicants have had, which has shaped their identities. As the model outlines, these experiences may be political, historical, cultural, or word related (Association of American Medical Colleges, 2013).

## **Research Question**

To understand the nature and presence of core competencies in the medical school admissions process for students who completed the final year of a healthcare pipeline program, the following research question guided this study:

- How are the Association of American Medical Colleges (AAMC)'s Core Competencies for Entering Medical Students displayed in the medical school application process of students who completed a healthcare pipeline program?

The Institutional Research Board (IRB) at the university where I completed this dissertation approved this study without the filing of an IRB application, due to the de-identified nature of the data collected and utilized in this research study (Appendix A).

## **Methodological Approach Overview**

This research study employed a descriptive qualitative research study design, along with one element of case study for the purposes of data analysis (Merriam & Tisdell, 2016; Yin, 2018; Stake, 2006). The primary attribute I used from case study was the creation of a protocol, which Yin (2014) identified as a manner to ensure rigor in this research study and provide a roadmap for the data collection and data analysis procedures. While I did not complete a case study, I created a protocol to use as I examined each participant in my study, to ensure consistency in the procedures I followed.

Merriam and Tisdell (2016) described the function of descriptive designs to “systematically describe the facts and characteristics of a given phenomenon” (p. 5). The format of a qualitative descriptive study was appropriate because the purpose of the study

was to describe the contents of the medical school admissions process for students who have completed the final level of a healthcare pipeline program, which focused on preparing participants for medical school. A qualitative descriptive research design was appropriate because the nature of the study was to understand a specific event by a group of individuals (Lambert & Lambert, 2012). In other words, the nature of this research study was to understand the admissions process experienced by students who applied to medical school, using the admissions materials they submitted. Participants were selected from the total number of students who completed the final level of the healthcare pipeline program, applied to the medical school in the 2016-2017 academic year, and had received an invitation to interview.

Upon examination of all students who participated in the healthcare pipeline program, a layered sampling approach including stratified purposeful sampling and criterion sampling was applied to select the six study participants (Patton, 2015). In order to select a random set of participants from those whom had applied to the medical school, I eliminated any applicants who did not have multiple mini-interview comments included in their applications. I chose to eliminate participants who did not have interview comments because I was interested in evaluating the interview comments, along with other aspects of the application, for the full research study. Finally, I ensured that the six study participants mirrored the race and gender of the state in which the healthcare pipeline program is held, by selecting participants according to these metrics.

I obtained the completed application for each of the six study participants from the admissions office of the medical school. Due to the de-identified nature of the data I

received, my study was approved by the IRB office at the institution where I am completing my doctoral degree (Appendix A). I examined five different pieces of data for each of the study participants.

The first data point was the personal statement, which I used in my first stage of data collection to code for the presence of core competencies. The personal statement is provided by the applicant and is focused on expressing the motivations for applying to medical school, along with relevant experiences and events which have led to a decision to attend medical school (Association of American Medical Colleges, 2018). The personal statement is submitted along with the electronic application for medical school.

The second data point was the secondary application. This portion of the medical school application process is institution-specific and crafted by the institutions, in order to ask applicants to provide more specialized information to the medical school than what the general application requires. Students who are successfully selected by the admissions committee in the first round of review are asked to submit a secondary application.

Comments provided from the individual interviews that applicants completed on their interview days were the third data point collected. Each applicant completed two separate individual interviews, which were structured and followed an objective rubric of scoring, along with commentary provided by the interviewers (Patrick, Altmaier, Kuperman, & Ugolini, 2001). The rubric provided to the admissions committee member conducting the interview asks for the interviewer to assign values to the questions asked in the structured individual interview.

The fourth data point were the comments provided from the multiple mini interviews (MMIs), which are short scenario-based experiences, in which the applicant must read a situational prompt and interact with a standardized patient for a limited amount of time (Eva, Reiter, Rosenfeld, Trinh, Wood, & Norman, 2012). The standardized patients had the option to provide comments, following the encounters.

Letters of recommendation comprised the fifth data point. Applicants had the option to provide up to five letters of recommendation in their application materials. The letters of recommendation varied in style and length and originated from references who may have known the applicants in a professional, academic, personal, or clinical setting (Association of American Medical Colleges, 2018). The purpose of the letters of recommendation is to understand the applicant from a vantage point of individuals who know the applicant beyond the contents of the application.

Data analysis for this research study was twofold. Because I primarily used documents for this research study, I employed document analysis in order to “uncover meaning, develop understanding, and discover insights relevant to the research problem” (Bowen, 2009). In addition to the application materials, I also obtained documentation describing the healthcare pipeline program, the health system which housed the healthcare pipeline program, and the medical school. I read through all documents, completed a thorough content analysis, and employed thematic analysis to understand emergent patterns and themes which arose from the various documents (Bowen, 2009).

The second form of data analysis employed in this research study during data collection and data analysis involved the use of framework analysis (Ritchie & Spencer,

1994). This form of thematic analysis was used to further develop the emergent themes and recurrent topics found in the data. I used the existent framework of the core competencies provided by the Association of American Medical Colleges (2019b) for the first round of coding of my data, and then used framework analysis to further develop and interpret emergent themes. I discussed the process of developing my coding framework in chapters three and four.

### **Significance of the Study**

This research study was significant because it addressed a gap in the literature regarding whether identified characteristics for entering medical students are evident in the medical school admissions process. Students have sought ways to further differentiate themselves from their peers in the admissions process, in order to be accepted to medical school (Association of American Medical Colleges, 2019b; Association of American Medical Colleges, 2019c; Association of American Medical Colleges, 2019f). The emergence of career readiness/professional skills in the evaluation process of medical school applicants represents a shift from a review of quantitative metrics towards a more holistic examination of an applicant to medical school (Monroe, Quinn, Samuelson, Dunleavy, & Dowd, 2013).

While there was historical literature available on the evolution of the composition of core competencies for entering medical students (Association of American Medical Colleges, 2019b), I found no literature which examines the presence of these core competencies in the received application materials of medical school applicants, as well as the impact of these core competencies on the admissions process as a whole.

Therefore, the need for this research study is paramount in the further development of holistic admissions processes to reflect the guidelines identified by the Association of American Medical Colleges (AAMC) and how these core competencies are displayed in the materials composed by an applicant for medical school.

### **Assumptions and Limitations**

Through this research study, I wanted to understand the presence of core competencies displayed in the admissions materials of students applying for medical school who have already completed the final year of a healthcare pipeline program. I assumed those who completed the final year of the healthcare pipeline program used the knowledge they gained from the program to inform their application materials. I also assumed that based on the number of hours spent on the curriculum in the healthcare pipeline program, core competencies would be evident and explicitly stated in the application materials. Finally, I made the assumption that those individuals who were closely involved in the development of the healthcare curriculum would be able to validate the assumptions I made through my assignment of core competencies for each module taught in the curriculum of the final year of the healthcare pipeline program.

In terms of the data collection process, I assumed the application materials I selected for data collection would provide the best snapshot of the presence of core competencies in the participants' applications. Because I chose to complete a qualitative study based on application materials, I was limited to collecting data that was already included in the application materials submitted for medical school admissions. With limited literature available on the core competencies playing a role in medical school

admissions, I assumed my findings would add to the literature in terms of whether competency education is present in the medical school admissions process. Finally, I also assumed the findings from this research would add to future research related to holistic admissions, the medical school application process, and how core competencies function in the decision-making process of aspiring medical school students.

I noted some limitations to this research study. As the researcher, I did not know whether participants in the healthcare pipeline program had participated in any other medical preparation program or activity. I was also limited to the data that was collected on participants by the office of admissions. In other words, I was only able to review a set amount of data collected by the university admissions office during the interview season.

Another limitation I noted was my knowledge of the medical school admissions process at other institutions. Many medical schools do not publish the precise formula they use when accepting students to their incoming class. I chose to focus this research study on one medical school admissions process, because of my in-depth knowledge of the medical school's admissions and decision-making process. Because this was a qualitative descriptive study focused specifically on the participants of this program, the results of this study cannot be generalized to all pipeline programs or all medical schools.

### **Overview of Positionality Statement**

As a current scholar-practitioner (Kram, Wasserman, & Yip, 2012), I have been fortunate to work in a profession that is ripe with opportunities for further research study into the practice and administration of undergraduate medical education (Association of American Medical Colleges, 2019a) and graduate medical education (Accreditation



Council for Graduate Medical Education, 2019). While I work in the development and administration of physicians in the years following graduation from medical school, I volunteer with the medical school, serving on the general admissions committee, as well as the subcommittee which makes decisions on candidates with unique circumstances. In addition to this role, I also volunteer as a faculty member with the healthcare pipeline program offered by the health system. In this role, I interact with student participants in the first and final years of the program, delivering curriculum content, advising, and mentoring students throughout their journeys into healthcare careers.

My interests in studying the medical education pipeline arose from these professional and volunteer experiences. At each point in the pipeline, there are specific skills or competencies which must be mastered in order to move forward to the next level of medical education. To successfully complete graduate medical education (i.e. residency or fellowship years), competencies must be achieved which are known as entrustable professional activities (EPA) (Association of American Medical Colleges, 2019h).

To graduate from undergraduate medical education (i.e. medical school), competencies must be achieved (Krisberg, 2016; Koenig, et al., 2013). To be admitted to medical school, undergraduate students should show mastery of the identified core competencies of entering medical students, which have been identified by the Association of American Medical Colleges (AAMC) (Association of American Medical Colleges, 2019b). Understanding each touchpoint in the pipeline is paramount to ensuring a smooth transition from one touchpoint to the next one.

The creation of the healthcare pipeline program attempted to address two primary issues: a lack of education about the healthcare field and what knowledge and skills are needed to successfully navigate careers in healthcare (Thames, 2014). Working in the healthcare pipeline program has allowed me to interact with a variety of students, from those who have defined their academic and professional career paths to those who are contemplating the possibilities of various career options and are simply in an exploration phase.

I consider myself to have an interpretivist epistemology, because I recognize the intricate and unique nature of individuals who experience and understand the world in differing ways (Crotty, 2015; Sipe & Constable, 1996). While I have in-depth knowledge into medical education because of the experiences I outlined, I attempted to address this research study through the interpretivist lens that understands reality to be constructed by the meanings that individuals create for themselves based on their experiences.

Competencies in medical education are criteria established to show mastery of skills and attributes (Association of American Medical Colleges, 2019b; Koenig, et al., 2013), but the manner in which these competencies are expressed or displayed may be done so in a variety of ways, which is dependent upon the individual's understanding of the competencies (Koenig, et al., 2013; Association of American Medical Colleges, 2005).

### **Definition of Terms**

The following definition of terms will be used for this study:

- Accepted applicant: “a person who has applied to one of the U.S. MD-granting medical schools and who has been offered admission to (i.e., been

accepted by) one or more of those schools” (Association of American Medical Colleges, 2019e, para. 3)

- Allopathic medicine: “a system in which medical doctors and other healthcare professionals treat symptoms and diseases using drugs, radiation, or surgery” (National Cancer Institute, 2019)
- American Medical Association (AMA): a national medical convention which was established in 1847 for the purposes of “scientific advancement, standards for medical education, launching a program of medical ethics, and improving public health” (American Medical Association, 2019, para. 1); this association was responsible for the establishment of standards for medical schools
- American Medical College Application Service® (AMCAS®): “a centralized application processing service that is current available only to applicants to the first-year entering classes at participating U.S. medical schools (AAMC, 2018, p. 1).
- Association of American Medical Colleges (AAMC): “founded in 1876 and based in Washington, D.C.; a not-for-profit association dedicated to transforming health care through innovative medical education, cutting-edge patient care, and groundbreaking medical research” (Association of American Medical Colleges, 2019d, para. 1)
- Competency: areas of excellence that demonstrate skills, knowledge, and capabilities and which “provide a framework to consider and communicate how your work, activities, and life experiences can help you demonstrate

readiness for medical school” (Association of American Medical Colleges, 2019f, para. 1)

- First-Year Enrollment: “includes persons enrolled in class level 1 at a U.S. MD-granting medical school, including those students repeating the first year because they did not advance in class level” (Association of American Medical Colleges, 2019e, para. 10)
- Grade Point Average (GPA): “a number representing the average value of the accumulated final grades earned in courses over time” (Great Schools Partnership, 2014, para. 1)
- Healthcare: “the set of services provided by a country or an organization for the treatment of the physically and the mentally ill” (Cambridge Dictionary, 2019, para. 1)
- Holistic review: “a flexible, individualized way for admission committees to consider an applicant, with balanced consideration given to experiences, attributes, and academic metrics” (Association of American Medical Colleges, 2019f, para. 1)
- Letter of recommendation: also referred to as a letter of evaluation; “a confidential letter sent directly to the application service by a person (or your undergraduate institution’s committee) on your behalf”; these letters “should highlight your personal qualities, characteristics, competencies, and capabilities as a future physician, from the perspective of someone who knows you” (Association of American Medical Colleges, 2019, para. 2 & 3)

- Medical College Admissions Test (MCAT): a “standardized, multiple-choice examination created to help medical school admissions offices assess your problem solving, critical thinking, and knowledge of natural, behavioral, and social science concepts and principles prerequisite to the study of medicine” (Association of American Medical Colleges, 2019a, para. 1).
- Multiple Mini Interviews (MMI): “interview format that consists of a series of interview stations, each focused on a different question or scenario” and serves the purpose of measuring “competencies like oral communication, social and non-verbal skills, and teamwork that are important indicators of how an applicant will interact with patients and colleagues as a physician” (Association of American Medical Colleges, 2019e, para. 1)
- Osteopathic medicine: a “holistic approach” to a four year medical degree, in which practitioners “see each person as more than just a collection of organ systems and body parts that may become injured or diseased” and who situate the symptoms a patient is experiencing with the holistic view of the patient’s life and circumstance (American Association of Colleges of Osteopathic Medicine, 2019a, para. 6)
- Personal Statement: “opportunity to distinguish yourself from other applicants” and “tell the medical school something about yourself that they wouldn’t necessarily learn by looking at other parts of the application” by providing a narrative that elaborates on “things such as challenges, obstacles or distance traveled – how admissions officers refer to those life challenges

you've faced and conquered" (Association of American Medical Colleges, 2019e, para. 2)

- Pipeline Program: opportunities or initiatives which "provide mentorship and education," exposure to various experiences, and increase the matriculation of students into professional programs (Pereleman School of Medicine, 2019, para. 2-3)
- Secondary application: an additional form of questions of the medical school application process which is "specific to each school and focus[es] on the specific values and interest" of the medical school (Association of American Medical Colleges, 2019c)
- U.S. medical school: any school that grants degrees of the Doctor of Medicine (MD) and is accredited by the Liaison Committee on Medical Education (LCME); does not include DO-granting medical schools" (Association of American Medical Colleges, 2019e, para. 19)

### **Chapter Summary**

This research study was focused on understanding the presence of competencies in the medical school admissions process. By exploring the admissions process through the lens of students who completed their final year of a healthcare pipeline program, the study provided insight into the presence of core competencies of medical school as components of the admissions applications submitted by the students who completed the final year of the healthcare pipeline program. This study also offered ways in which students may be evaluated for admissions into medical school, based on the core

competencies for entering medical school students (Association of American Medical Colleges, 2019b).

In this chapter, I provided a brief introduction to my research study. I highlighted the current literature addressing my research topic and my motivations to study this research topic. I explained the purpose of the study, which was to understand the presence of core competencies in the medical school admissions process of students who have completed the final year of a healthcare pipeline program. I stated the problem: while there are a growing number of students interested in becoming physicians, there are only a limited number of spots in medical school, and therefore, students must take on activities and experiences which differentiate them from their peers and prepare them to be accepted into medical school. I provided an overview of this research study's conceptual framework which included one theory and one model: (a) Sternberg's Triarchic Theory of Intelligence (1984); (b) the Experiences-Attributes-Metrics model from the Association of American Medical Colleges (2013).

I presented the main research question used to examine the presence of core competencies in the admissions process for students who have completed the final level of a healthcare pipeline program. I gave an overview of my methodological approach- a descriptive qualitative study with elements of case study analysis included in the data analysis section. Finally, I shared the significance of this study, assumptions and limitations to address before the research study, my positionality statement, and ended with definitions of key terms.

In the following chapter, I reviewed the literature for this study. This literature review focused on three main topics, including 1) core competencies, 2) medical school admissions, and 3) pipeline programs, as well as literature which was related to my conceptual framework.



## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **Introduction**

I began my literature search by looking at research studies focused on the use of competencies and competency based medical education. I search studies which addressed the historical timeline of competencies and their usage across the medical education continuum. Then, I examined research studies on medical school admissions and its various components (application process, interviews, etc.). I searched for studies which evaluated singular admissions processes, as well as comprehensive meta-analyses which addressed various studies throughout the ongoing development of medical education. Finally, I reviewed research studies related to pipeline programs and experiences. All of the literature sources I reviewed in this chapter were centered on the following research question:

- How are the Association of American Medical Colleges (AAMC)'s Core Competencies for Entering Medical Students displayed in the medical school application process of students who completed a healthcare pipeline program?

To conduct a thorough background and literature review for this research study, I utilized search engines to collect scholarly articles through my university's library, as well as through my employer's medical library. These databases included ERIC, EBSCO, Education Research Complete, and PubMed. I chose to use these databases, given the

prominence of medically related academic journals and articles included in these databases.

To guide my literature search, I used the following keywords: *pipeline programs, workforce development, medical school admissions, statistical admissions, holistic admissions, competencies, competency based medical education, medical competencies, outcome-based education concepts, and competency preparation*. As such, I offer the following review which outlines literature addressing competency based medical education, medical school admissions, and pipeline programs.

### **Conceptual Framework**

To frame the literature in this research study, I began with an overview of the conceptual framework I chose to examine for this study. The conceptual framework included an explanation of Sternberg's Triarchic Theory of Intelligence (1984) and the Association of American Medical Colleges' (2013) Experiences-Attributes-Metrics Model.

#### **Sternberg's Triarchic Theory of Intelligence**

The Theory of Successful Intelligence (2007), known as Sternberg's Triarchic Theory of Intelligence, recognized the variety of ways to define intelligence which are unable to be captured with the narrow lens by which intelligence is measured through traditional teaching and assessment techniques in education. Sternberg (2003) offered a definition of intelligence to be "generalized adaptation to the environment (p. 139). In several of his studies, Sternberg cautioned the narrow scope of how educators defined

intelligence, which discredits other forms of intelligence expressed by students (Sternberg, 2003; Sternberg 1984).

Sternberg (2007) defined successful intelligence in three ways: (1) a skillset of abilities based on sociocultural environment; (2) awareness of strengths and weaknesses and understanding how to adjust life choices because of these factors; (3) adaptations and changes to the environment through the “balanced use” of analytical, creative, and practical abilities (Sternberg, 1984; Sternberg, 2007, p. S105). The connecting factor between these three forms of expressions of intelligence is knowledge which may be used in various thought process, depending on the situational and environmental context (Sternberg, 2007).

Sternberg (2007)’s theory encompassed three categorizations of mental abilities: analytical, creative, and practical. Of these three abilities, only analytical abilities have been measured through traditional academic assessments (Sternberg, 2003). Knowledge is utilized to navigate and balance the three abilities Sternberg (2007) outlined. At knowledge generation, creative abilities are utilized, analytical abilities delineate a good idea from a bad idea, and implementation and stakeholder engagement occur when practical abilities are employed (Sternberg, 2007; Sternberg, 1984). Sternberg (2007) argued not for the equal presence of these abilities in a person’s life, but for the interrelated, symbiotic relationship these abilities may have in someone’s life who is successfully intelligent. Sternberg’s (2007) theory of multiple intelligences built upon Gardner’s (2006) prior work on intelligence theory, which addresses multiple levels of

intelligence and the need for various levels of assessment to capture the unique levels of intelligence individuals possessed (Ahvan & Pour, 2016).

In the first portion of his definition of intelligence, Sternberg (2003) argued in favor of an individual's personal definition of success rather than a societal criterion of success, such as standardized test scores or personal income, as long as it is within the sociocultural context of the individual. In other words, what may constitute as success in one sociocultural context may not be considered successful in another context. Therefore, Sternberg (2003) argued for the establishment of individual goals based upon the individual's ability to succeed, rather than the magnitude by which success may be achieved (which differs among individuals). The key to success in this portion of his definition of intelligence is to live and work within the means of how success may be attained in the appropriate sociocultural context (Sternberg, 2003; Sternberg 2007).

The second portion of Sternberg's (2003) definition of intelligence focused on the insight individuals possessed to understand their own personal strengths and weakness as in their pursuit of intelligence. This discernment between strengths and opportunities to grow lead individuals towards success in any given occupation. Sternberg (2003) argued for the recognition that success may be achieved in a variety of methods. He also emphasized awareness of individuals' personal attributes which may promote or hinder their success (Sternberg, 2003).

The third portion of intelligence, according to Sternberg (2003), recognized an inter-connected relationship between an individual and his environment, and the connection between both as differing forms of possessing intelligence. He labeled

“modifying oneself to suit the environment” as adaptation, “modifying the environment to suit oneself” as shaping, and “finding a new environment that is a better match to one’s skills, values, or desires” as selection. Sternberg (2003) argued for an awareness of these three concepts, as they relate to problem solving and organizational change. In other words, Sternberg (2003) recognized that prior to individuals seeking ways to shape change, there needed to be a balance between these three environmental shifts.

Sternberg (2003) outlined the relationship between analytical, creative, and practical abilities in achieving success. He noted that analytical abilities were already captured through “traditional tests for abilities” (p. 142), but traditional tests are incapable of capturing and emphasizing creative or practical abilities. Sternberg (2003) advocated for these abilities to be captured and celebrated, as they contributed to facets of intelligence and capabilities to succeed.

Sternberg’s (2007) work has played a significant role in the admissions process of medical schools. Using his theory, Sternberg (2007) argued that intelligence is not measured solely based on test scores alone. Instead, he stressed using the traditional testing scores, in addition to examining the abilities of the applicants, in the admissions process (Sternberg, 1984; Sternberg & The Rainbow Project Collaborators, 2006).

Sternberg’s (2007) theory is useful in informing this study because it examines the notion of intelligence and the inability to define intelligence in a singular manner. Because of the multi-faceted nature of intelligence types, educators must understand the various ways intelligence may be expressed. By understanding of the various intelligence

types, educators can also provide diverse avenues to deliver and measure educational objectives.

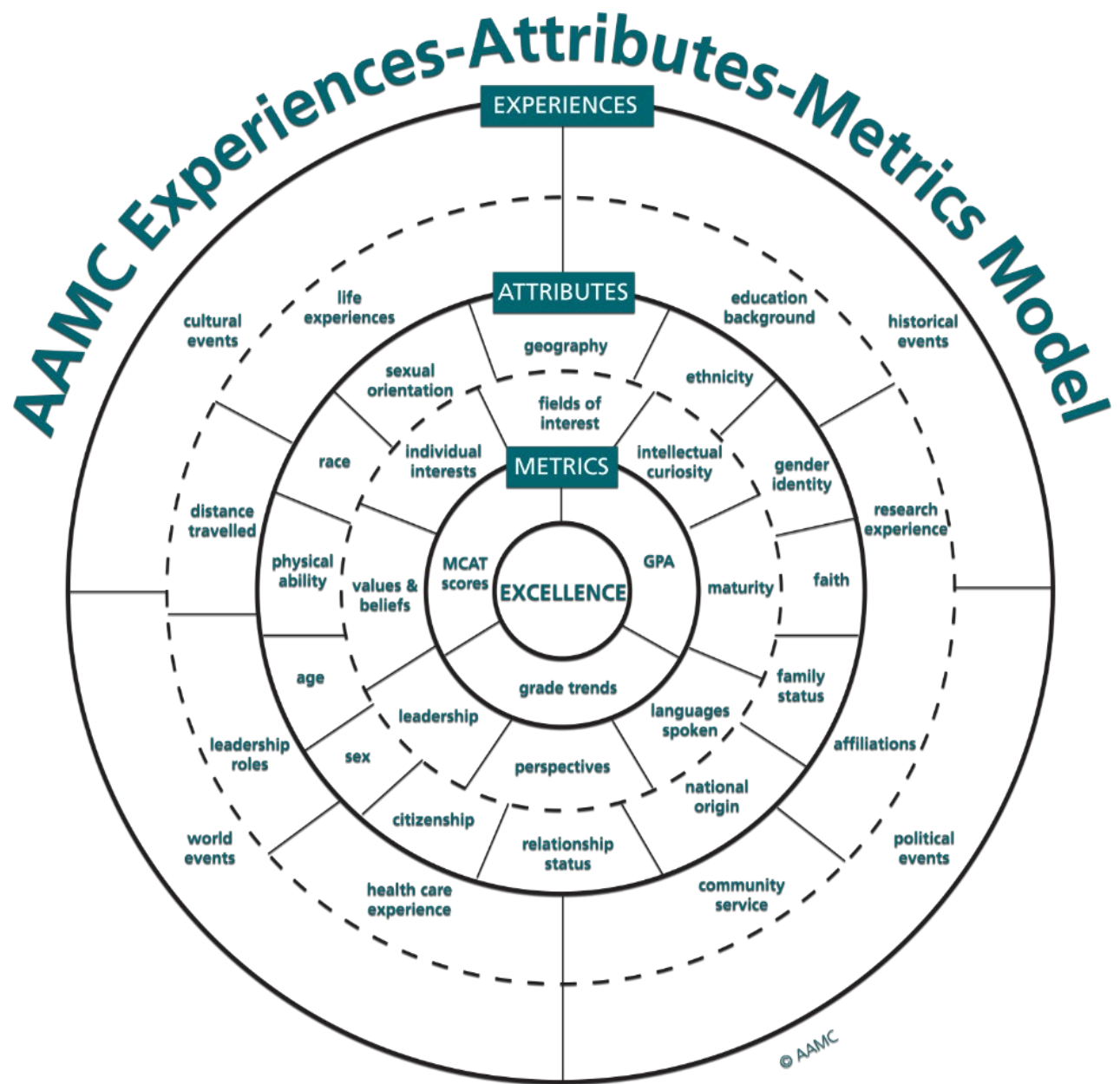
### **AAMC Experiences-Attributes-Metrics Model**

Launched in 2007, the Association of American Medical Colleges (AAMC) introduced the Holistic Review Project. The initiative focused on addressing the evolution of the medical school admissions process beyond a focus on statistical admissions parameters only (Association of American Medical Colleges, 2013). The work expanded on the concept that as medicine evolves, the admissions process must also “widen the lens through which we view applicants,” so that the process encompasses applicants representing a broader array of characteristics which make them viable medical school candidates (p. 2).

Central to the premise of holistic admissions is a structure introduced by the Association of American Medical Colleges (AAMC) known as the AAMC Experience-Attributes-Metrics Model (Association of American Medical Colleges, 2013). This model includes “consideration of many dimensions of applicants, broadening the context in which their development, accomplishments, and potential can be evaluated” (Witzburg & Sondheimer, 2013, p. 1566). At the center of the model is the focus on metrics, which includes course grades, standardized test scores, and grade point averages. The second layer addresses attributes, or characteristics of applicants which define who they are or the backgrounds they represent. The final layer is related to experiences that applicants have had, which has shaped their identities. As the model outlines, these experiences may

be political, historical, cultural, or word related (Association of American Medical Colleges, 2013).

The significance of using such a model to evaluate candidates has established new methods to evaluate candidates' applicancy in the admissions process (Association of American Medical Colleges, 2013). This model supports the evolution of applicant review from a statistical process to becoming holistic in nature (Witzburg & Sondheimer, 2013; Conrad et al., 2016). I have included the model in Figure 1. Note that this model is represented in this pilot study with permission granted by the author, who states it may be "reproduce[d] for educational purposes" at the bottom of the website where it is displayed (Association of American Medical Colleges, 2013, p. 2).



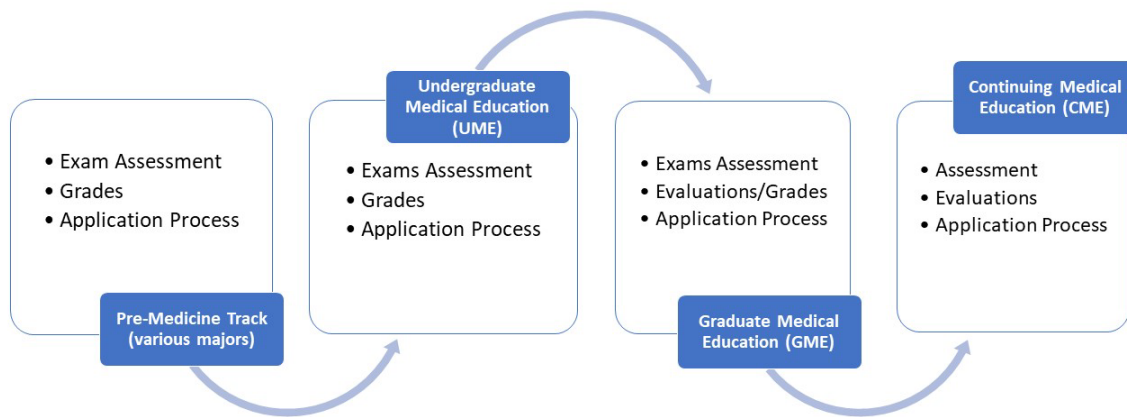
Adapted from *Workforce America: Managing Employee Diversity as a Vital Resource*, McGraw Hill Publishing, 1990.

Figure 2.1. AAMC Experiences-Attributes-Metrics Model



## Medical Education Continuum

To situate the topics in this literature review, I designed a figure below to illustrate what Thomas, Kern, Hughes, and Chen (2016) described as the continuum of medical education. The figure emphasizes the steps needed to advance from one stage of medical education to the next. Note the figure is a simplified explanation of the components of each stage of medical education for the Doctor of Medicine (MD) degree. This research study is focused on allopathic medicine and the MD degree only (Association of American Medical Colleges, 2019d). The graphic is intended to provide an introductory roadmap for this literature review.



*Figure 2.2.* The Medical Education Continuum and necessary components to advance from one stage of education to the next.

At the first stage of the continuum are students interested in pursuing a career as a physician. These individuals complete the necessary pre-medicine courses, in order to take the medical colleges admissions test (MCAT). Through a review of a student's

MCAT score, grades during undergraduate school, and a lengthy application process including an interview, students gain admissions into medical school, which is referred to as undergraduate medical education (UME) (Association of American Medical Colleges, 2019a; Association of American Medical Colleges, 2019e).

Undergraduate medical education (UME) consists of two years of didactic education, followed by two years of clinical rotations, in which medical students complete medical school exams, as well as national qualifier exams (e.g., Step 1 and Step 2). Through a review of exam scores, grades received in medical school, and a lengthy application process and interview, medical students will be admitted to residency programs and enroll in graduate medical education (Association of American Medical Colleges, 2019h).

Graduate Medical Education (GME) programs vary in length, from three years to seven years, and are specific to the medical specialty that the individual is pursuing. Residents complete national exams, as well as in-residency training, which are evaluated by senior physicians who supervise the residents. Following successful completion of residency, residents may choose to seek further specialized training in fellowships or may enter the workforce as attending physicians and/or core academic faculty in medicine (Accreditation Council for Graduate Medical Education, 2019).

As fully licensed physicians, continuing medical education (CME) provides continuous educational opportunities for license renewals and board preparation exams (board exams must be renewed every ten years). These activities may be in the form of national conferences, symposia, and meetings structured around annual updates to

medical diagnoses and treatment plans. The purpose of these activities and requirements are to ensure physicians have the latest information on the most recent literature and developments in medicine (McMahon, 2018; Stevenson & Moore, 2018).

This information provides additional context for my work in this study by providing an overview of the medical education continuum. This background information establishes the basis for understanding how individuals move from the educational journey to the medical journey through medical education.

### **Competency Based Medical Education (CBME)**

The development of competency-based medical education (CBME) has spanned many years and was based on the successful efforts on the industrial and business professions. These professions focused primarily on evaluation of specific outcomes and tasks in the workplace (Frank, Snell, Englander, & Holmboe, 2017). To better understand competencies in medical education, I provided a brief history of the development of competency-based medical education.

Because the competencies vary between levels of medical education, I examined CBME within graduate medical education (GME), which is related to residencies and fellowships, as well as CBME within undergraduate medical education (UME), which refers to the four years of medical school. Finally, I addressed the competencies established by the Association of American Medical Colleges (AAMC) for pre-health students who are entering medical school.

While this literature review addressed competencies in medical education, I noted the presence of competencies across other industries and professions. I elected to focus

this literature review on the medical profession only, due to its specified nature of competencies leading to licensure-related careers. Because of their specificity, these competencies are more prescriptive and linked to the licensure requirements of the medical profession.

### **Historical Development of Competencies in Medical Education**

The use of competencies in education can be traced to the late 1940s, when psychologist Ralph Tyler (1949) introduced outcome-based thinking in education. His thought process revolved around education, answering questions related to the purpose of educational offerings, how one might participate in the offerings, and how the offerings may be assessed for efficacy (ten Cate, 2017; Harden, 2002). Following Tyler's work, Bloom (1956) developed a six-level taxonomy of educational objectives, which later was categorized by researchers as lower-order skills (did not require high levels of cognitive processing) or higher-order skills (required higher levels of cognitive processing) (Adams, 2015). Bloom's (1956) work resulted in the term mastery learning, which encompassed the introduction of curriculum specialization and personalization for learners.

The evolution of competencies among other industries outside of medicine developed as a response to the growing improvements in science, technology, and globalization (ten Cate, 2017). These competencies encouraged schools to introduce a way for learners to "increase levels of skills and flexibility to serve a competitive economy" (ten Cate, 2017, p. 1). Vocational education was introduced as a way for industry to ensure productivity and employability based on a certain set of parameters

that must be achieved to successfully graduate from an educational program (McGrath & Powell, 2016). There was criticism, however, with industry's involvement in setting educational objectives and parameters, as educational leaders recognized the influence of industry on education and the presence of "industry-determined outcomes" (ten Cate, 2017, p. 2).

Tyler (1949) was instrumental in the evolution of competency based medical education (CBME), through his work with instituting objectives-based education within courses at a midwestern medical school in the mid-1950s (ten Cate, 2017). Many later developments in medical education referenced education leaders such as Tyler for laying the foundation work on outcome-based education (Carraccio et al., 2017; Harden, 2002). Prior research situated medical education between the development of educational objectives and the necessity for targeted vocational training as future physicians (ten Cate, 2017; Guskey, 1992).

Within medicine, competency based medical education (CBME) signified a shift in education from "evolved tradition" to "predefined outcomes" (ten Cate, 2017, p. 1). The introduction of competencies in medical education aided in the ability for the curriculum to be flexible and individualized towards the learner's abilities, while also working towards an acceptable set of standards of practice that signified mastery of learning in medical school. McGaghie (1978) differentiated CBME from traditional curriculum in three ways: 1) the ability for a medical student to perform tasks and skills required to practice medicine in the medical setting; 2) the belief a medical student would

be able to achieve mastery in the performance objectives, and 3) there would be a way to show mastery of these objectives through empirical means.

McGaghie's (1978) work set the foundation for countries to adopt competency-based medical education (CBME) internationally, to meet the needs of diverse populations (Frank, Snell, Englander, & Holmboe, 2017). Carraccio, Englander, Van Melle, ten Cate, Lockyer, Chan, Frank, & Snell (2016) further defined CBME in three basic points, noting that 1) medical education must be designed so that it addresses societal needs; 2) medical education is outcomes-focused, and not process or structure focused only; and 3) there must be a coherent continuum which moves students from early medical school learning through to a competent practitioner.

Researchers have approached the topic of competencies in medical education in differing ways (Swing, 2007; Norman, 1985). Epstein and Hundert (2002) examined prior studies on medical education competencies and defined competence as "the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served" (p. 226). Ten Cate (2017) recognized a defining characteristic of competency-based medical education (CBME) to be that of "time independence" (p. 3). He argued for the learner to be at the center of the training, rather than a race to complete training and achieve competency, which would be variable to all learners, based on their level of competence (ten Cate, 2017).

## **Competencies in Graduate Medical Education (GME)**

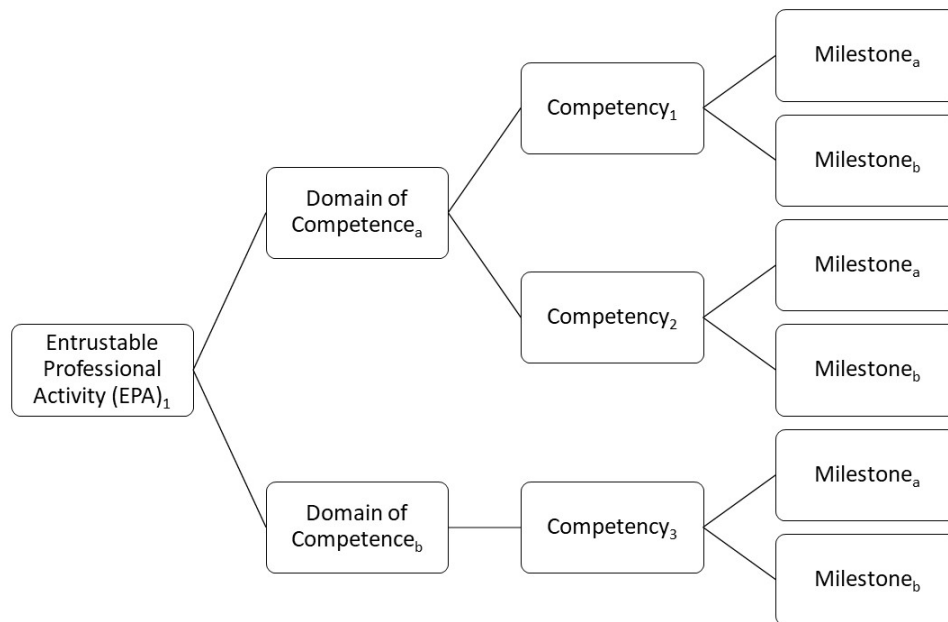
Much of the literature regarding medical education competencies is focused on graduate medical education (GME), which encompasses individuals who have successfully completed medical school and are completing training in a residency or fellowship program (Association of American Medical Colleges, 2018b). The Accreditation Council for Graduate Medical Education (ACGME) introduced the following six competences for graduate medical education: “1) patient care, 2) medical knowledge, 3) practice-based learning and environment, 4) interpersonal and communication skills, 5) professionalism, and 6) systems-based practice” (Malik, Diaz Voss Varela, Stewart, Laeco, Yenokyan, Francis, & Bhatti, 2012, p. 425). Medical education researchers noted the broad categorization of the ACGME’s competencies and the possibility that medical students may achieve partial competence over these broad categorizations (ten Cate, 2017; Carraccio et al., 2017).

Englander, Cameron, Ballard, Dodge, Bull, and Aschenbrener (2013) delineated these competencies as domains of competence, which are competencies that are broader categorizations and comprised of multiple competencies (Englander, Cameron, Addams, Bull, & Jacobs, 2015). To further define achievement within these domains of competence, medical education leadership further developed milestones, which are defined as specialty-specific performance markers to determine mastery of skills and attributes leading towards the competencies and domains of competence (Edgar, Robers, Yaghmour, Leep Hunderfund, Hamstra, Conforti, & Holmboe, 2018; Englander et al., 2016; Englander et al., 2015; Frank et al., 2010).

The elements of milestones, competencies, and domains of competence culminate into the mastery of what has been defined as entrustable professional activities (EPAs). These activities may be carried out without direct supervision of the individual carrying out the activity (Englander et al., 2015). EPAs were developed to focus on care delivery and address the limitations of using competencies as the only measurement for performance (Englander et al., 2016; ten Cate, 2005). Because these activities may address various competencies, EPAs are measured by the milestones and competencies, and result in the achievement of various levels of supervision required (Englander et al., 2016).

At the graduate medical education level, entrustable professional activity (EPA) achievement is signified when residents and fellows complete medically related activities without direct supervision (e.g. the resident may perform the medical treatment without the presence of an attending physician). Assessing EPAs aligned the graduate medical education assessment standards with the needs of the healthcare delivery system, because EPAs are directly focused on the clinical learning environment (Mejicano & Bumsted, 2018; Iobst et al., 2010). To further envision the competency framework for GME, I have provided Figure X, which is adapted from the figure provided in research by Englander et al. (2016; 2015).





*Figure 2.3.* Diagram depicting the relationship between entrustable professional activities, domains of competence, competencies, and milestones (adapted from figures included in Englander et al., 2016; Englander et al., 2015).

### **Competencies in Undergraduate Medical Education (UME)**

As graduate medical education (GME) continued to reform and more widely implement entrustable professional activities (EPAs) and milestones as part of their training (ten Cate, 2005), researchers recognized a disconnect between the requirements of residency training and a lack of similar measurement of educational objectives for medical students (Englander et al., 2016; Englander et al, 2013; Irby, Cooke, & O’Brien, 2010; Skochelak, 2010). Researchers recognized the focus of medical school training had been on education in the basic sciences for the first two years and an emphasis on the clinical sciences in the final two years of medical school; there was a notable absence of

outcomes-based educational objectives which would translate towards success in residency through measurement of EPAs and competencies (Englander et al., 2016). During 2013, researchers compiled a work group to introduce a core list of “professional activities that every MD graduate should be able to do without direct supervision (defined as the supervisor not physically present on day one of residency” (Englander et al., 2016, p. 1352). The purpose of this list was to ensure medical students were able to be trusted with the appropriate level of supervision. In addition, the list served as a way to introduce a level of assessment for which skills medical students had mastered (Kennedy, Lingard, Baker, Kitchen, & Regehr, 2007).

Through their yearlong work, the research group defined a list of 13 core EPAs for entering residency, which they identified as skills and activities all incoming residents (regardless of specialty) will be able to complete on the first day of residency without direct supervision from a senior physician (Englander et al., 2016). The research team mapped these EPAs to eight domains of competencies for general physician practice, which was adapted from earlier work on competencies, completed by the Accreditation Council for Graduate Medical Education (ACGME) in 2012 (Accreditation Council for Graduate Medical Education, 2012).

### **AAMC Core Competencies for Entering Medical Students**

The introduction of entrustable professional activities (EPAs) and associated competencies for graduating medical students addressed the gap in skills and abilities assessment for medical students entering residency (Accreditation Council of Graduate Medical Education, 2013). Despite mechanisms of assessment for medical students, a gap

existed between students seeking admissions into medical school and those who were admitted. In addition, there was a need to identify what characteristics were needed to be successful in medical school (Koenig, Parrish, Terregino, Williams, Dunleavy, & Volsch, 2013; Schwartzstein, Rosenfeld, Hilborn, Oyewole, & Mitchell, 2013). The literature addressed the need for a more comprehensive examination of applicants' strengths and attributes (Petty, Metzl, & Keeys, 2017; Holmboe, 2015), but there was only minimal literature which focused specifically on which attributes, or competencies, were evident in the admissions process (Koenig et al., 2013). My research study addressed this gap in the literature by focusing on competencies identified by the Association of American Medical Colleges (AAMC) as necessary to the success of a medical school student (Association of American Medical Colleges, 2019b). Kirch, Gusic, and Ast (2015) noted the presence of these core competencies in medical students may be representative of experiences that originated from a medical student's personal life, K-12 life, and throughout prior education levels leading up to medical school admissions.

Prior research on medical school admissions revealed variability among which characteristics were of focus in the medical school admissions decision process (Koenig et al., 2013). Albanese et al. (2003) provided a list of over 85 characteristics used nationwide to make decisions on which students should receive an offer of admissions to medical school. A prominent characteristic identified included resilience to recover from setbacks (Tempski et al., 2015). Further literature cited the importance of these characteristics, noting they were related to improved patient care outcome scores and patient satisfaction ratings of their experiences with physicians (Hojat, Louis, Markham,

Wender, Rabinowitz, & Gonnella, 2011; Duberstein, Meldrum, Fiscella, Shields, & Epstein, 2007).

The Association of American Medical Colleges (AAMC) introduced the need for competencies at the pre-medical level, to standardize the review of applicants into medical school (Association of American Medical Colleges, 2019b). A list of 15 core competencies for entering medical students was established (Association of American Medical Colleges, 2019). These competencies were vetted through three major committees (Monroe, Quinn, Samuelson, Dunleavy, & Dowd, 2013; Koenig et al., 2013).

The fifth medical college admissions test (MCAT) Review Committee, known as the MR5 Committee, was an advisory committee appointed by the Association of American Medical Colleges (AAMC). The committee was tasked with conducting five comprehensive reviews of the Medical College Admissions Test (MCAT) between 2008 and 2009 (Monroe, Quinn, Samuelson, Dunleavy, & Dowd, 2013; Dunleavy & Whitaker, 2011). Their work was then passed to the Innovation Lab Working Group (ILWG), which conducted a job analysis for adequate skills entering medical students should possess when joining medical school (Koenig et al., 2013).

The work of the MR5 Committee was informed through surveys and input from the Accreditation Council of Graduate Medical Education (ACGME) (2012) Outcomes and Milestones Project. This project focused on competency development for individuals completing residency (Accreditation Council of Graduate Medical Education, 2012). Recommendations for six core personal competencies were sent to the final group, the Association of American Medical Colleges' (AAMC) Admissions Initiative (Mahon,

Henderson, & Kirch, 2013). These six competencies included: 1) ethical responsibility to self and others, 2) reliability and dependability, 3) service orientation, 4) social skills, 5) capacity for improvement, and 6) resilience and adaptability.

The Accreditation Council on Graduate Medical Education (ACGME) Outcomes and Milestones Project reviewed the proposals sent forth, along with the recommendation for three additional competencies (cultural competence, oral communication, and teamwork), to form nine core competencies for entering medical students (Koenig et al., 2013; Mahon, Henderson, & Kirch, 2013). The remaining six competencies were developed and endorsed by the AAMC Group on Student Affairs and included: 1) critical thinking, 2) quantitative reasoning, 3) scientific inquiry, 4) written communication, 5) living systems, and 6) human behavior (Association of American Medical Colleges, 2019b). The endorsement of these final competencies culminated in the establishment of competencies in the medical school admissions process.

Fifteen competencies for Entering Medical Students are outlined by the Association of American Medical Colleges (AAMC) which allow applicants to “demonstrate skills, knowledge, and capabilities” to become a successful medical school student (Association of American Medical Colleges, 2019b, para. 1). These competencies have been linked to research which reveal the predictive validity of these core competencies on success in medical school, where success is defined as satisfactory clinical rotations, and throughout clinical practice (Kirch, Gusic, & Ast, 2015; Koenig et al., 2013). The competencies are divided into three categories, which are outlined and

defined in Appendix B. In the table below, I provided the core competencies arranged by their categorization, according to the Association of American Medical Colleges (2019b).

Table 2.1

*AAMC Core Competencies and Descriptions for Entering Medical Students*

<b>Competency Category</b>	<b>Competency</b>
Pre-Professional Competencies  (Interpersonal and Intrapersonal)	Service Orientation
	Social Skills
	Cultural Competence
	Teamwork
	Oral Communication
	Ethical Responsibility to Self and Others
	Reliability and Dependability
	Resilience and Adaptability
	Capacity for Improvement
Thinking and Reasoning	Critical Thinking
Competencies	Quantitative Reasoning
	Scientific Inquiry
	Written Communication
Science Competencies	Living Systems
	Human Behavior

## **Medical School Admissions**

As the number of medical colleges and universities continues to grow and evolve, the admissions process has shifted from a traditional to a more contemporary approach (Association of American Medical Colleges, 2013). In the following section, I highlighted the evolution from statistical admissions review to holistic admissions review. I also included key components of holistic admissions which have been utilized by medical school admissions committees to select their incoming medical student class.

### **Statistical Admissions**

Prior research studies have pointed towards the effect of statistical admissions towards acceptance into medical school (Raman, Lukmanji, Walker, Myhre, Coderre, & McLaughlin, 2019; Gay, Santen, Mangrulkar, Sisson, Ross, & Bibler Zaidi, 2018; Sesate, Milem, McIntosh, & Bryan, 2017; Fayrolle et al., 2016; Searcy, Dowd, Hughes, Baldwin, & Pigg, 2015; Donnon, Paolucci, & Violato, 2007). Prior literature noted a correlation between standardized testing and high general intelligence or critical thinking skills (Schreurs, Cleutjens, Muijtjens, Cleland, & oude Egbrink, 2018; Kreiter & Axelson, 2013; Cleland, Dowell, McLachlan, Nicholson, & Patterson, 2012). Admissions offices deemed scores on standardized tests as measures for acceptance and success into graduate school.

Within the realm of medical school, admissions committees have referred to the numerical application components of grade point average (GPA) and the medical college admissions test (MCAT) scores to predict future success in a medical school curriculum (Gay et al., 2018; Saguil et al., 2015; Dixon, 2012). GPA is determined throughout the

courses undertaken in their undergraduate or graduate school years, depending on when the student is applying to medical school (e.g. after their undergraduate years or after they have worked in a profession for some years, beyond undergraduate school) (Bretz, 1989). Cleland, Dowell, McLachlan, Nicholson, and Patterson (2012) noted the use of GPA as an indicator of performance in medical school, along with its predictive validity regarding residency performance (Peskun, Detsky, & Shandling, 2007).

The Medical College Admissions Test (MCAT) was established in the late 1920s as a mechanism to measure readiness for medical school (McGaghie, 2002). The first form of the test was focused primarily on memorization of material necessary to complete the first two years of medical school. Throughout its five revisions, the test has evolved from true-false, multiple choice questions to the inclusion of a writing section in the 1990s (McGaghie, 2002). The final iteration of the MCAT review removed the writing section but added sections of testing on biochemistry, psychology, and sociology concepts (Association of American Medical Colleges, 2015).

Nationally, admissions into medical school remains highly competitive (Association of American Medical Colleges, 2019g). Data presented by the Association of American Medical Colleges (AAMC) on medical school applicants indicated a decrease in the number of applicants to medical school between the 2016 and 2018 applicant cycles (Association of American Medical Colleges, 2019g). Despite the decrease in applications received, the data revealed an increase in the mean MCAT score reported, and an increase in the mean GPA score of applicants. Of those who matriculated, the data depicted an increase between the two application cycles, as well as



among MCAT and GPA scores. While there was no literature available to discuss the decrease in the number of applications between the 2016 application cycle and the 2018 application cycle, the data on MCAT and GPA scores revealed a much more competitive arena for applications (Association of American Medical Colleges, 2019g). A summary of applicant and matriculant data is included in Table 2.2 below.

Table 2.2

*Admissions Data Comparison Between 2016 Admissions Cycle and 2017 Admissions Cycle for Allopathic Medical Schools*

<b>Metrics</b>	<b>Applicants to Medical School</b>			<b>Matriculants to Medical School</b>		
	<b>2016-2017</b>	<b>2018-2019</b>	<b>% Change</b>	<b>2016-2017</b>	<b>2018-2019</b>	<b>% Change</b>
# Applicants	53,042	52,777	-0.50%	21,030	21,622	+2.82%
Total MCAT	501.8	505.6	+0.76%	508.7	511.2	+0.49%
Total GPA	3.55	3.57	+0.56%	3.70	3.72	+0.54%

Despite the relevance of statistical admissions in the medical school admissions process, there have been growing concerns that this form of admissions alone cannot account for the best qualified applicants to medical school (Schreurs et al., 2018; Cleland, Dowell, McLachlan, Nicholson, & Patterson, 2012; Donnon, Paolucci, & Violato, 2007; Julian, 2005). A criticism of using statistical admissions lies in the fact that “student motivation and interest, which are critical for sustained effort through graduate education, must be inferred from various unstandardized measures including letters of

recommendation, personal statements, and interviews” (Kuncel & Hezlett, 2007, p. 1081). Looking at admissions through a strictly quantitative, data-driven eye fails “to convey the full story of an applicant and the paths they have taken,” which may be able to justify factors affecting the quantitative snapshot of an applicant’s file (Conrad et al., 2016, p. 1472). Donnon, Paolucci, and Violato (2007)’s study focused on the use of the MCAT score in predicting performance during medical school and on licensing examinations. Their research revealed only a small to medium predictive validity range for predicting success, thereby suggesting admissions committees find alternative means to evaluate candidates for medical school, which might have a larger predictive validity effect (Donnon, Paolucci, & Violato, 2007).

### **Holistic Admissions**

The concept of looking beyond traditional, numerical scores in an admissions process was evident as early as 60 years ago, when attributes such as “character and integrity” were discussed as characteristics needed to be an effective physician (Conrad et al., 2016, p. 1472). Committees sought ways to measure these attributes in a manner that would assist them with formulating classes filled with successful future physicians. Prior to adopting a holistic approach to admissions, some medical schools opted to look specifically at race and ethnicity to diversify their classes. However, with the decision of the University of California vs. Bakke court case in 1978, schools were encouraged to use a holistic approach to admissions, examining demographic data in conjunction with academic metrics as a means by which admissions decisions may be made (Conrad et al., 2016; Scott & Zerwic, 2015).

In this court case, which went before the Supreme Court, a Caucasian student was denied admissions twice to the medical school at the University of Southern California at Davis (USCD), despite the fact that his statistical admissions scores were higher than some students who were admitted to the medical school and who identified as underrepresented minorities. The medical school admissions committee had previously held a certain number of spots in the admissions process for underrepresented minorities, but the Supreme Court ordered that the quota system be removed from the admissions process at USCD (Ball, 2000). Under their ruling, the committee may only use race as a factor among many factors in their admissions process, and not as the primary factor for admissions (Ball, 2000).

Holistic review can be described as a process that is “strategically designed, evidence-driven, mission-based, diversity-aware” (Conrad et al., 2016, p. 1472). Conrad et al. (2016) likened holistic review as, “marrying the art with the science without sacrificing the unique value that each brings” (p. 1472). Graduate programs in health care point to the fact that holistic admissions foster environments that celebrate diverse thoughts and beliefs for everyone involved (Scott & Zerwic, 2015, p. 489). Kirch, Gusic, and Ast (2015) further defined this admissions review process to “facilitate a broad view of an applicant’s capabilities beyond academic competencies as reflected in grades and test scores” (p. 1797). Monroe, Quinn, Samuelson, Dunleavy, & Dowd (2013) noted a gradual shift from statistical admissions as a means of guaranteeing a place in medical school towards a process which invites applicants to provide greater depth to their applications through a variety of other avenues included in a holistic admissions process.

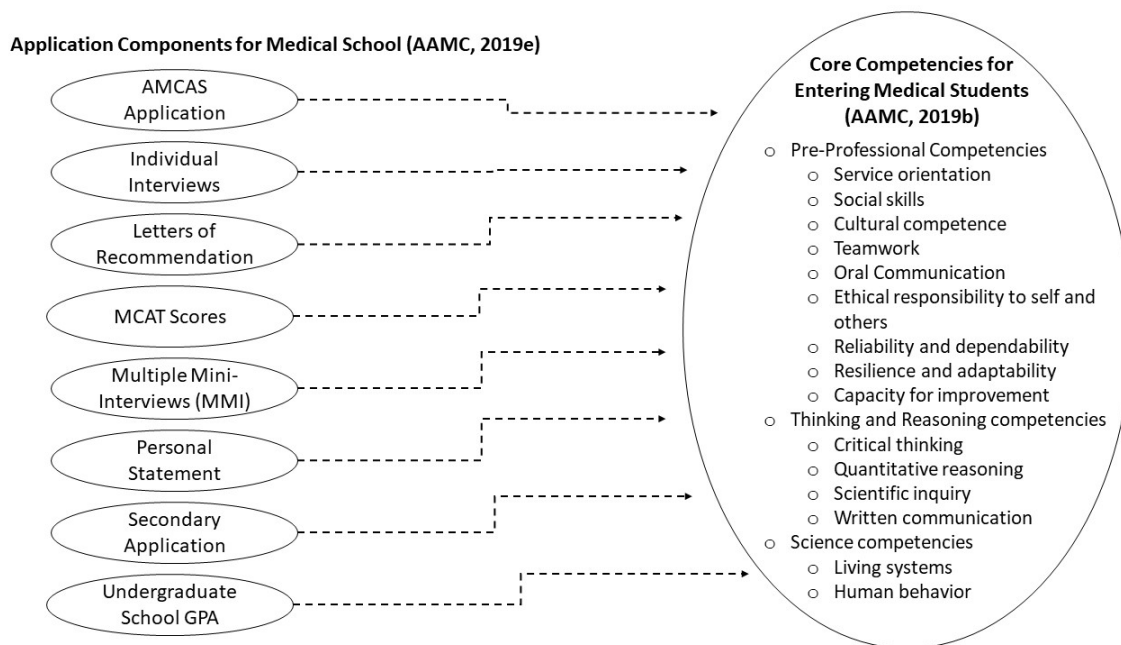
Witzburg and Sondheimer (2013) explained that holistic review of applications provided an avenue for applicants to display their contributions to the medical school environment. The Association of American Medical Colleges (AAMC) defined this approach to admissions review as “a flexible, individualized way of assessing an applicant’s capabilities by which balanced consideration is given to experiences, attributes, and academic metrics... and, when considered in combination, how the individual might contribute value as a medical student and future physician” (Witzburg & Sondheimer, 2013, p. 1565). Holistic review does not disregard or abandon the notion of statistical review. These metrics are reviewed, but they are considered in the broad scope of the applicant’s life experiences and the applicant’s ability to endure their journey to get to where they are today (Witzburg & Sondheimer, 2013). The magnitude of holistic review has also led to the most recent iteration of the Medical College Admission Test (MCAT), which included sections addressing social and behavioral health factors and determinants (Kirch, Gusic, & Ast, 2015).

Witzburg and Sondheimer (2013) defined holistic review as specific to institutions, meaning each institution based their review process on what characteristics and attributes will be most prominent and necessary for success in their program. Success, therefore, is identified at the institution-level and may be based on unique factors identified by the institution (Benbassat & Baomal, 2007). Individuals who have overcome adversity in their personal and academic life may be regarded as strong candidates. Training is essential for admissions committee members to evaluate

candidates in a holistic manner, to minimize the presence of implicit or explicit bias in the review process (Witzburg & Sondheimer, 2013).

While the evolution of holistic admissions encompassed more components of a student's application to medical school, the presence of statistical scores in the admissions process was not abandoned (Singh, Modi, Kumar, Dhaliwal, Gupta, & Sood, 2017; Donnon, Paolucci, & Violato, 2007; Benbassat & Baumal, 2007). In their research survey of over 120 admissions deans nationwide, Monroe, Quinn, Samuelson, Dunleavy, and Dowd (2013) noted the utilization of Medical College Admission Test (MCAT) and Grade Point Average (GPA) as two metrics to determine who the admissions committee would invite to complete a secondary application and to interview for admissions to their medical schools. While these scores are employed at one stage in the admissions process, researchers reiterated the overall use of holistic admissions to provide greater depth of admissions candidates (Monroe et al., 2013).

To better understand the components of the medical school admissions process, I searched the literature for information related specifically to interviews, personal statements, and letters of recommendation, components in the Association of American Medical Colleges (AAMC) general application (Association of American Medical Colleges, 2019e; Association of American Medical Colleges, 2018). Because this research study is examining the presence of core competencies in the medical school admissions, I constructed the graphic below to illustrate the various components of the medical school admissions process, in relation to the core competencies (Association of American Medical Colleges, 2019e; Association of American Medical Colleges, 2019f).



*Figure 2.4.* Components of the medical school application process and their relationship to the Core Competencies for Entering Medical Students (information adapted from Association of American Medical Colleges, 2019b; Association of American Medical Colleges, 2019e; Association of American Medical Colleges, 2018)

### **Interview (Traditional and MMI).**

Various research studies commented on the use of the interview as one of the strongest factors in gaining admissions to medical school (Monroe et al., 2013; Eva, Rosenfield, Reiter, & Norman, 2004; Albanese, Snow, Skochelak, Huggett, & Farrell, 2003). Kreiter et al. (2004) referenced a 1981 research study among U.S. medical schools, which indicated the interview as the second most important source of information in the medical school admissions process, behind the statistical admissions scores (e.g. MCAT and GPA scores). A study conducted ten years later recognized the

interview as the most important aspect of the admissions process (Johnson & Edwards, 1991). Prior studies revealed the use of statistical metrics as the primary factors in granting interviews to medical school (Monroe et al., 2013), while letters of recommendation and interviews as the primary factors in acceptance to medical school, a notion supported through a study from the Association of American Medical Colleges (AAMC) in 2011 (Henderson et al., 2018).

The purpose of the interview process is to “collect the data necessary to make informed admissions decisions” about applicants desiring to attend medical school (Bibler Zaidi et al, 2016, p. 1527), such as personal characteristics data (Dunleavy & Whitaker, 2011). There are two types of interviews which may be conducted in a holistic admissions process: a) the traditional interview and b) multiple mini-interviews.

Traditional interviews may be structured or unstructured. While structured interviews have structured questions and scoring rubrics to follow, unstructured interviews have been called into question for the existence of bias in the format and scoring of interviews without rubrics or set questions to follow (Patrick et al., 2001).

The use of traditional structured interviews has shown positive results in the admissions process (Dunleavy & Whitaker, 2011). In the results of their study, Patrick et al. (2001) indicated applicants who were admitted to the medical school scored higher on their interviews than those who were waitlisted; the scores of the waitlisted students were higher than those who were rejected. Interviewer pairs who evaluated the same applicants also had similar scores to one another, which is significant when looking at structured interviews with structured rubrics versus unstructured interviews. The researchers

concluded the need to use interview scores “in addition to traditional selection criteria” (Patrick et al., 2001. P. 71). Henderson et al. (2018) found the use of traditional interviews among disadvantaged students to be a positive factor in their admissions decisions, due to the amount of time the candidate was able to spend with the interview committee and the depth by which the applicant was able to address the prescribed interview questions.

Criticism of the traditional interview referred to the notion that they “do not lend themselves well to quantitative scrutiny” due to the variability in the manner that these interviews are conducted and scored (Patrick et al, 2001). Bibler Zaidi et al. (2016) noted prior literature which calls into question the reliability of using traditional interviews only to assess applicants. Jerant et al. (2019) did not discredit traditional interviews as methods to predict success in medical school, but they noted that traditional interviews may only support a “limited net advantage in standardized testing or subjective clerkship performance ratings” (p. 393).

Eva, Rosenfeld, Reiter, and Norman (2004) were credited as introducing the multiple mini-interview (MMI) component to the medical school admissions process. The multiple mini-interview is a component of medical school admissions with proven predictive validity towards medical school performance on curriculum examinations (e.g. examinations called SHELF exams and objective structured clinical examinations known as OSCEs) as well as national board examinations (e.g. Step 1 and Step 2) (Jerant et al., 2019; Husbands & Dowell, 2013; Eva et al., 2004).



Prior studies focused on multiple mini interviews revealed greater consistency in this form of admissions measurement in admissions studies from around the world (Jerant et al., 2019). Bibler Zaidi et al. (2016) described MMIs as “a highlighted structured assessment process with multiple interviews in which each interview is focused around a specific prompt – commonly referred to as a scenario” (p. 1526). These scenarios may be brief but have a semi-structured assessment by trained interviewers or simulated patients which may be used to assess problem solving competencies (Jerant et al., 2019; Henderson et al., 2018).

MMIs were designed to assess cognitive and non-cognitive traits which may not be assessed through a traditional interview (Eva et al., 2004), such as any of the following: “collegiality and collaboration, honesty and integrity, ethics, responsibility and reliability, cultural sensitivity, empathy, and self-assessment” (Lemay, Lockyer, Collin, & Brownell, 2007, p. 574). Prior research studies have shown the presence of core competencies in the MMIs, such as critical thinking and communication skills, which points to the predictive validity of MMIs and performance while in medical school (Kirch, Gusic, & Ast, 2015; Pau, Jeevaratnam, Chen, Fall, Khoo, & Nadarajah, 2013).

Studies show mixed results regarding the use of MMIs over traditional interviews. Jerant et al. (2019) completed a longitudinal study on the predictive validity of interview scores on future academic performance in medical school and national examinations among five medical schools in California. Study results found that MMI scores had greater predictive validity for academic performance than traditional interview scores. Bibler Zaidi et al. (2016) contrasted the MMI with the traditional interview, noting that

because the format of the traditional interview may be structured or unstructured, the reliability of using traditional interview scores to predict success in medical school was low. However, researchers recognized that with an extended period of time to interact with applicants, those who conducted traditional interviews were able to understand and probe into details included in the applicant's application for admissions through the "open ended dialogue" between the applicant and the interviewer (p. 1526).

Criticism of the use of MMI referred to the depth of conversation and the nature of the interaction between the applicant and the interviewer on interview day (Kumar et al., 2009). While this method of interviewing has gained popularity across medical schools in recent years, the authors noted disadvantages to relying solely on these interviews. One such disadvantage noted was the shortened time with applicants during these experiences, which the authors recognized may not give interviewers adequate time to evaluate a candidate's ability to succeed in medical school (Bibler Zaidi et al., 2016).

Henderson et al. (2018) concluded that disadvantaged students performed better on traditional interviews but lower on MMIs, which they attributed to the "content, brevity, high level of structure, and speed" of MMIs (p. 1032). Jerant et al. (2019) noted a previous study revealed higher MMI scores for students who identified as extroverted, due to the shortened, fast-paced nature of the scenario times and the unpredictability of the individual who would be performing the interview.

The search of literature revealed a study which called the use of interviews in the admissions process into question. Kreiter et al. (2004) refuted the use of interview score to be weighted as heavily as statistical metrics in the medical school admissions process.

In their study, researchers examined applicants who were re-applying to the medical school, due to a rejection the year prior. They found a low to moderate reliability between the interview scores from the first year and the second year, indicating there was a low correlation between the evaluation of the candidate from the first year to the second year. While they note limitations on not being able to assess the activities which the applicant engaged in between years, the researchers concluded that more consideration should be made to how heavily interview scores weigh in the final decision of the admissions process.

#### **Personal Statements.**

Contrasting the literature on interviews, there was significantly less literature available on personal statements and their efficacy in the medical school admissions process. There are, however, several literature guides explaining the purpose of the personal statement and how they may be constructed (Bekins, Huckin, & Kijak, 2004; Baer & Jones, 2003). As a component of the medical school application, personal statements fall under the non-cognitive factors, which are not focused primarily on quantitative measures of success, such as the medical college admission test (MCAT) and undergraduate grade point average (GPA) (Ferguson, James, & Madeley, 2002; Ferguson, Sanders, O’Hehir, & James, 2000).

The Association of American Medical Colleges (AAMC) described the purpose of the personal statement was to “reveal something about yourself and your thoughts around your future in medicine while also making an argument that provides evidence supporting your readiness for your career” (Association of American Medical Colleges,

2019i, para. 1). Researchers referred to the role of the personal statement as the marker by which individual may “position themselves as potential members” of the medical community (Bekins, Huckin, & Kijak, 2004, p. 57). Given the latitude applicants have to craft their personal statements, the only limitation is the number of characters by which the applicant must construct the personal statement (Association of American Medical Colleges, 2019e).

The foundation of the personal statement intends to avoid being too prescriptive, so applicants may display unique individuality in their work (Ding, 2007). As such, variability exists among the purpose and approach of applicants in constructing their personal statements (Ding, 2007; Bekins, Huckin, & Kijak, 2004; Albanese et al, 2003). Ding (2007) conducted a multi-level discourse analysis on personal statements within the medical and dental profession and identified five themes across all personal statements analyzed, including the following: 1) motivations to pursue a career in medicine/dentistry; 2) applicable credentials and experiences related to the field of study; 3) how life experiences aligned with medicine or dentistry; 4) future aspirations as a career professional in the area of study; and 5) relevant personality characteristics. Bekins, Huckin, and Kijak (2004) found personal statements labeled as successful were not necessary aligned with a summary of prior clinical experiences, but they were related to the introspection of candidates to reflect upon their experiences and their motivations to pursue a medical career.

Prior studies revealed that personal statements predicted applicant’s ability to receive an interview for medical school admissions (McManus & Richards, 1989), but

later research studies failed to find predictive validity in the content of personal statements and success in medical school (Murphy, Klieger, Borneman, & Kuncel, 2009; Ferguson, James, & Madeley, 2002; Ferguson, Sanders, O’Hehir, & James, 2000). Dong, Kay, Artino, Gilliland, Waechter, Cruess, DeZee and Durning (2013) broadened their study beyond personal statements to examine applicant essays for medical school admissions and found a low association between the scores assigned to the essays submitted for medical school applications and performance on first year examinations and internships completed in the first year of medical school.

While my research study focused on the admissions process for medical school, I consulted literature on the efficacy of personal statements for residency applications. Personal statements at the level of residency have been described anecdotally among some programs as the deciding factor in granting interviews to possible residency candidates (Barton, Ariail, & Smith, 2004). In their research study, Barton, Ariail, and Smith (2004) found content of personal statements to follow a general pattern of oscillation between personal characteristics and professional qualifications relevant to the residency program the medical student was seeking to join. Applicants who strayed from a prescribed rubric of notating clinical experiences, along with personal motivation and desires to enter a career in medicine, were found to have personal statements called into question and not ranked as highly by researchers (Barton, Ariail, & Smith, 2004).

Despite limited literature being available pertaining to personal statements, I noted that reviewing the literature on this area of study had many limitations. The research studies which have been conducted on personal statements have been limited to

single institution studies, and therefore their results are not generalizable across other medical schools or professional schools. Additionally, the subjectivity which remains in whether a personal statement is considered a “strong” or “weak” piece of writing is dependent upon the judgement of the standards of the university and the readers of the personal statement (Parry, Mathers, Stevens, Parsons, Lilford, Spurgeon, & Thomas, 2006).

### **Letters of Recommendation.**

Kuncel, Kochevar, and Ones (2014) noted the importance of letters of recommendation as one of the primary components in admissions processes, along with standardized test scores and prior grades received. Letters of recommendation are intended to give voice to those who can comment and evaluate the suitability of candidates and their relevant qualifications for medical school (McCarthy & Goffin, 2001). Much like the personal statement, letters of recommendation are not prescriptive to a specific format or form (Kirch, Gusic, & Ast, 2015). Letters of recommendation may be written by a single author or may be a composite letter, collaborated by multiple authors (Association of American Medical Colleges, 2019j).

The Association of American Medical Colleges (AAMC) outlined the purpose of the letter of recommendation (also referred to as the letter of evaluation) as a way for someone to “assess your qualities, characteristics, and capabilities” and be considered by the admissions committee on behalf of the applicant (Association of American Medical Colleges, 2019j). The shift from statistical to holistic admissions for medical school also included an overhaul and further clarification of the guidelines for submitting letters of

recommendation, petitioning writers to address the core competencies for entering medical students in their letters (Kirch, Gusic, & Ast, 2015). Kuncel, Kochevar, and Ones (2014) recommended the presence of themes such as “motivation, drive, persistence, and conscientiousness” (p. 105) as themes addressed in letters of recommendation, due to these areas of behavior not able to be observed in other parts of the application (Ferguson, James, & Madeley, 2002).

While this portion of the application was intended to provide an in-depth explanation of individuals and the reasoning behind their candidacy to medical school, researchers noted inconsistencies with the efficacy of letters of recommendation (Kuncel, Kochevar, & Ones, 2014). Because students had the ability to choose who submitted letters in support of their applications, there was a level of bias in the interpretation of letters of recommendation towards medical school candidacy (Kuncel, Kochevar, & Ones, 2014). Additionally, Madera, Hebl, and Martin (2009) found gender differences between the content of letters of recommendation written for females versus males, thereby noting the presence of bias in this component of the medical school application. DeZee (2014) noted a criticism of letters of recommendation was their ability to inflate certain positive characteristics of applicants while failing to paint a complete picture of an applicant’s strengths and weaknesses. Additionally, the labor-intensive time that must be taken to read through multiple letters of recommendation submitted on behalf of the applicant was noted as a criticism to the role of letters of recommendation in the admissions process.

Studies focused on letters of recommendation have resulted in wide variability of their ratings and effectiveness in predicting applicant success (DeZee et al., 2014; Kuncel, Kochevar, & Ones, 2014; Dirschl & Adams, 2000). In their retrospective cohort study, DeZee et al. (2014) determined letters of recommendation to medical school did not predict later performance in medical school, signified by whether students were ranked in the high or low categories of their classes, based on their academic performance. Researchers noted the presence of positive descriptions of applicants to be those who were ranked highly, while non-positive comments found in the letters written about lower ranking students. There were several limitations noted in the study, including the use of only one school's data of admitted students, which may have affected the approach letter writers took when addressing the admissions criteria of the school itself (DeZee et al., 2014).

### **Pipeline Programs**

Despite the existence of competencies and the prescriptive means by which medical school admissions cycles are conducted, students may choose to participate in specialized avenues of experiences and initiatives, to better educate themselves on how to successfully navigate through the medical education process. To increase competitiveness in medical school admissions, pre-medical, undergraduate students complete various courses, lectures, and practicum experiences to better understand and navigate their educational experiences into their intended career path (Bouye, McCleary, & Williams, 2016; Thames, 2014). Despite the plethora of experiences presented to students interested in healthcare careers, gaining access to a health system's clinical learning environment is



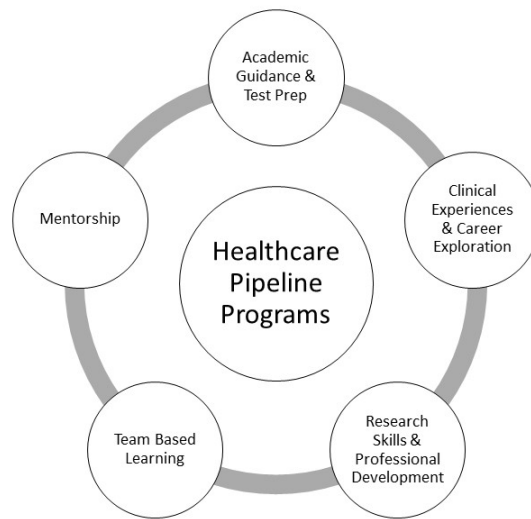
difficult, due to constraints of the clinical learning environment and number of opportunities available to all interested students (Weiss, Bagian, & Nasca, 2013; Gordon, Hazlett, ten Cate, Mann, Kilminster, Prince, O'Driscoll, Snell, & Newble, 2000). With patient privacy and quality at the forefront of healthcare systems' missions (Terry & Francis, 2007), there is a need to provide a secure and enriching portal by which students may access the healthcare learning environment.

For students to complete clinical observations, shadow practitioners, and interact with healthcare professionals, students participate in pipeline programs, which are an alternative entry into the clinical learning environment (Thames, 2014). These programs may vary in purpose and length, but they function as a method by which diverse students gain access to the healthcare learning environment (Katz, Barbosa-Leiker, & Benavides-Vaello, 2016).

### **Why Pipeline Programs?**

Pipeline program experiences provide participants with firsthand exposure and knowledge of careers, which in turn, aid them in making informed career decisions. Within the literature, there were a growing number of studies which indicated that students' personal health may be affected by their "education, income, ethnicity and culture, and geographic locale" (Dalley et al., 2009, p. 1374). Therefore, the need for students to be exposed to the healthcare field affected not only their future educational and professional aspirations, but also their personal health and future health decisions. In the figure below, I illustrated some of the primary tenets healthcare pipeline programs

may provide to students enrolled in these experiences and initiatives. This figure summarizes components across various healthcare pipeline programs.



*Figure 2.5.* Tenets and focal points that healthcare pipeline program curriculums may address.

With over 1100 various careers in the healthcare profession, it can be quite daunting to choose a profession simply by reading about it in a book or hearing secondhand from practitioners’ personalized experiences (Wang et al., 2015). Scholars and professionals argued that increasing “the diversity of the U.S. physician workforce” had positive correlation with improving the access and quality of healthcare in various populations (Freeman et al., 2015, p. 1). Therefore, the need for robust and intentional interfacing with various careers empowers students to make educated decisions of a lasting impact (Terrell & Beaudreau, 2003).

Pipeline programs arose out of a need to affect workforce development and workforce readiness (Freeman et al., 2015). Their structure, while dependent on their mission, was formed in such a way that students were able to interact with practitioners, while also receiving personal and professional development instruction (i.e. personal statement writing, interview skills, study skills, etc.) (Bouye, McCleary, & Williams, 2016). The results of many of these studies showed a positive correlation between student participation in pipeline programs and the intended outcome of the experiences (Thames 2014; Schultz, Hernandez, Woodcock, Estrada, Chance, Aguilar, & Serpe, 2011; Strayhorn, 2011).

The use of pipeline programs has been significant for creating access for students. Previously, access to healthcare environments relied on students' ability to use unofficial channels to gain access (i.e. by personally knowing healthcare professionals or through family connections) or through prior preceptor relationships which may exist (Newton, Billett, Jolly, & Ockerby, 2009). This level of access stands as a barrier to students who cannot navigate these unofficial channels or who do not have the ability to rely on personal connections (Freeman et al., 2015). Therefore, pipeline programs level the playing field for all students to gain access and receive the necessary resources to navigate their undergraduate to graduate education experiences (Thames 2014). Some pipeline programs have stemmed from researchers attempting to address human workforce theories, which explained the need for proper career choice and predicted the longevity of individuals who would be satisfied in their careers (Lu, Barriball, Zhang, While, 2012).

Pipeline programs have provided exposure to the workplace setting for careers of interest to student participants. Maslow's Hierarchy of Needs (Becker, 2011) included five levels of human needs which applied to human motivation in the work setting. Beyond our basic physiological needs, feeling safe, belonging to a group, and having positive esteem provides individuals with a work environment where they can realize their potential and can create lasting impact through their work. While Maslow argued different individuals seek different needs at any given time, the progression of needs remained true in the workplace, and therefore, a positive work environment ensured a fluidity of movement throughout these levels of needs.

In addition to Maslow's hierarchy of needs, a key theory which dealt with job satisfaction was the Job Characteristics Model (Hackman & Oldham, 1975). In this model, when the work environment was motivating, the level of job satisfaction was high. Characteristics such as the depth of job skills, work autonomy, and significance work duties attributed to the work environment, which affected job satisfaction. This model was critical in understanding pipeline programs, because as these experiences were created and implemented, students were interested in careers with a work environment that reinforces their own personal interests. Additionally, the topic of work-life balance is addressed in pipeline programs, as these experiences provide participants with a realistic and comprehensive view of potential careers and their challenges (Freeman et al., 2015).

While pipeline programs vary in their focus, their clientele, or their outcomes, the need for pipeline programs has been evident, based on the studies examined in this literature review. Freeman, Landry, Trevino, Grande, and Shea (2015) examined the

effect of the healthcare setting coming to students at their level. Completing a “Tour for Diversity in Medicine” (p. 2), physicians and dentists took the experience of healthcare to the campuses with high percentages of minority students. Based on focus groups conducted among over 80 participants, key findings included the lack of institutional resources, limited personal resources for obtaining experiences in healthcare, and a lack of “adequate information, mentoring, and advising either from within or outside” the college (p. 3). These findings further strengthened the need for pipeline programs to break down financial barriers, lack of resources, and a lack of connection with the clinical learning environment (Freeman, Landry, Trevino, Grande, & Shea, 2015).

### **Situating Pipeline Programs**

In this literature review, I focused on pipeline programs offered at the undergraduate and post-baccalaureate levels (Grumbach, 2006; Reeves, Vishwanatha, Yorio, Budd, & Sheedlo, 2008). Dutta-Moscato, Gopalakrishnan, Lotze, & Becich (2014) reported there were pipeline programs which existed to assist students at the high school level, such as exploratory camps and simulation exercises. While high school programs examined provided students with the ability to learn more about the plethora of healthcare career options, these programs lacked the depth of practice and mentorship that can carry a student through their undergraduate years. Pipeline programs at the undergraduate level have been organized to coincide with professional school admissions processes and required national examinations (Hesser, Cregler, & Lewis, 1998; Strayhorn, 1999). The undergraduate level was also a critical point in time when students

have the freedom to choose their courses of study and can plan to willingly participate in these activities (Thames, 2014).

This literature review examined pipeline programs focused on healthcare, due to the increasing demand of students wishing to experience the healthcare setting and the limits currently imposed on these environments. These pipeline programs provided an approved channel by which students may enter the clinical learning environment and have an enriching experience supported by the health system (Freeman et al., 2015; Thames, 2014).

### **Minority Success**

Meeting “the needs of all of the people” was a major point of concern for the evolution of pipeline programs for healthcare professions (Little et al., 1999, p. 340). Of the pipeline program studies evaluated in this literature review, one of the main areas of focus for pipeline programs has been in serving the underserved populations of healthcare, in terms of race and ethnicity (Bouye, McClearly, & Williams, 2016). Studies have revealed that “increasing the number of minority health practitioners in underserved communities...play a major role in reducing health disparities and addressing issues of health care access for at-risk populations,” because “URM [professionals] are more likely than their nonwhite peers to work in urban and other areas” which have more of an urban, underserved population (Smith et al., 2009, p. 836).

Citing the Hawaiian population as having less than five percent licensed doctors across the state, Little, Izutsu, Judd, and Else (1999) focused on how a pipeline program increased the diversity of Hawaiian doctors who were of Native Hawaiian descent. While

the curriculum of the program was focused on providing a hands-on approach towards contemporary issues in healthcare, researchers noted the introduction and celebration of Hawaiian specific culture as part of the curriculum.

While these components are attractive to many young students desiring to pursue an opportunity in healthcare, the Native Hawaiian students did not exhibit a high level of interest in the program offerings when offered. Therefore, researchers determined a large need in this community to fill these pipeline program spots was the emotional support and encouragement needed to motivate students to enroll in these programs (Little, Izutsu, Judd, and Else, 1999). As with other pipeline programs reviewed, the mentorship and guidance students need helped them to successfully navigate their way through a pipeline program, as well as into the admissions process of their chosen healthcare career field (Smith et al., 2009; Strayhorn, 1999).

Pipeline programs for underrepresented minorities examined admissions processes for healthcare professional schools and addressed why there was a lack of minorities who were successful in admissions (Pereleman School of Medicine, 2019; Strayhorn, 1999). Understanding why students were not offered a position in an admitted class started much earlier than when letters of acceptance were sent to the students. Students must be evaluated along certain entrance criteria to be admitted into the pipeline program itself. In some cases, such as my research study, admissions into the pipeline program was measured according to medical school admissions, and therefore admissions to the pipeline program was highly selective and rigorous (Strayhorn, 1999). In his study, Strayhorn (1999) focused on whether the performance of students during a pipeline

program predicted their performance in medical school, should they receive successful entry. This study was unique, in that the pipeline program was being evaluated on whether it had a positive effect on student performance as a medical or dental student, not only about whether they gained the necessary experiences to be competitive or not (Strayhorn, 1999).

Hesser, Cregler, and Lewis (1998) began looking quantitatively at key indicators of “cognitive and noncognitive variables” which affected success in matriculation of African American students in pipeline programs for medical school (p. 187). These factors included an exhaustive list of variables such as SAT scores (separated), GPA overall and GPA in the sciences, gender, type of college attended, parental backgrounds, and leadership and community service activity. By examining these cognitive and noncognitive variables, researchers were able to understand whether pipeline programs would be more successful through the implementation of curriculum focused on any of these given areas. Through their study, researchers revealed key cognitive variables which predicted success, as well as “the aspiration to become a physician” as the primary noncognitive variable leading to success in medical school matriculation (p. 190).

The research results of this study were particularly significant when looking at underrepresented minorities (and in this case African Americans specifically), because it strengthened the notion that pipeline programs may be well organized and programmed, complete with access and exposure to highly cognitive activities and experiences, benefitting students personally and as a group. However, if students do not have the ability to accept a “delay of goal gratification” in order to pursue their desired career,



their rate of success and resilience in the admissions process was affected, despite the experiences they gained in pipeline programs (Hesser, Cregler, & Lewis, 1998).

### **Socioeconomic Studies**

Pipeline programs have also been designed to address barriers which prevent students in rural or remote areas from being exposed to healthcare career opportunities (Kumar, Jones, Naden, & Roberts, 2015; Dalley et al., 2009). Economically disadvantaged students, amounting to less than 5.5% of the total number of students who enter medical school in Texas, faced difficulties in accessing healthcare programs, due to their lack of experiences which may be due to the caliber of institution attended (Dalley et al., 2009). The Joint Admission Medical Program (JAMP) in Texas sought to address and reduce the obstacles economically disadvantaged students face in pursuing medical education. To address access issues, JAMP matched up student participants with mentors assigned to them from the participating medical school. This relationship, along with the advising and planned activities during the semesters, afforded students with exposure to the medical school curriculum, advisement, and clinical environment (through summer internship and clinical research programs). Despite the many perks of this program, students were required to maintain a rigorous grade point average for the duration of their participation in the program through medical school (Dalley et al., 2009).

Kumar, Jones, Naden, and Roberts (2015) examined rural and remote students' access to health career decision making in New South Wales, Australia. To increase access to the healthcare setting, students from rural Broken Hill were enrolled in one day academies, where students engaged in “experiential small group activities related to

health promotion and literacy, information sharing about health careers, education pathways and options, and visits to various hospital and community-based healthcare sites” (p. 3). Results of this study revealed issues related to personal and geographic impediments, which played a role in rural students’ ability to make career choices in healthcare professions (Kumar, Jones, Naden, and Roberts, 2015). As with Dalley et al. (2009), the importance of mentoring relationships and hands on learning played a significant factor in the pipeline program experiences of the students in rural New South Wales.

### **Specific Educational Needs**

Prior to gaining successful entry into professional schools, students must be equipped with resources to assist them in their preparation. As Freeman et al. (2015) found, a lack of personal resources, such as financial inabilities and a lack of resources to prepare and take standardized test preparation significantly inhibited students from gaining admissions into professional schools in healthcare. Pipeline programs, such as “Pipeline, Profession, and Practice: Community based Dental Education” (Formicola et al., 2009, p. 346) focused their efforts on combating these barriers, by hosting students in summer enrichment programs and tailoring a curriculum to underrepresented minority students addressing their specific needs for dental school admissions.

Students must be critically aware of the demands of a career in healthcare, evolving beyond the media-infused television shows which purport careers in healthcare in a highly unrealistic manner (Wang et al., 2015). Critical to students’ applications to medical school is how much time students spend in the clinical setting. As mentioned

previously, without a clear pathway into the healthcare setting, students may struggle to be competitive amongst their peers. In their study, Wang, Lin, Lewis, Fetterman, and Gesundheit (2015) combined the development of academic and professional development skills along with the exposure to healthcare professionals via clinical shadowing opportunities. Through the Stanford Immersion in Medicine Series (SIMS), this study sought to understand whether increased exposure to healthcare professionals provided greater knowledge to students about the healthcare field. As a descriptive case study, researchers wanted to know how these experiences would affect students and their desire to enter careers in healthcare. Results indicated that “significant increases in student familiarity with medicine” (p. 631), had a positive correlation between student exposure and their increased knowledge in the healthcare field.

Beyond the United States, there was literature addressing a student-led initiative focused on students matriculating into medical school (Awad et al., 2014). This premedical program encouraged student participants not only to possess the critical thinking and logic skills learned during their undergraduate years, but that the students were able to use these skills successfully when faced with their first-year curriculum. Unique to this pipeline program, the peer-assisted learning curriculum provided students with the ability to learn from the senior medical students, who designed and taught the program curriculum. Workshops focused on “time management, note-taking, reading and understanding medical textbooks, and teamwork skills” (p. 58). While this pipeline program was specific to the medical school profession, the study may be generalizable to other careers. However, due to its unique nature of course design and delivery by

students, comparing this pipeline program to other pipeline programs was difficult, because the focus did not entail specific races, genders, and socioeconomic status.

### **Chapter Summary**

In this chapter, I provided a comprehensive literature review covering several aspects of my research study on the presence of Association of American Medical Colleges (AAMC) core competencies in the medical school admissions application process. I began this chapter with a comprehensive review of the conceptual framework utilized in this study, which included Sternberg's Triarchic Theory of Intelligence and the AAMC Experiences-Attributes-Metrics Model. These conceptual frameworks framed the basis for how intelligence may be measured in the admissions process, as well as the outlined skills, abilities, and characteristics identified in the review process for medical school admissions.

Following the conceptual framework, I reviewed literature on competencies in medical education, and I found that while extensive literature is available for competencies at the graduate medical education level, there were less resources available for undergraduate medical education. I noted the lack of prior research on medical school admissions competencies as a gap in the literature related to admissions. I also performed a review of medical school admissions literature, noting the various components of the admissions process. There were limited resources for the personal statement and letters of recommendation application components, but comprehensive literature discussing the use of interviews in the admissions process.

This literature review concludes by focusing on pipeline programs, which are one avenue by which students may gain insight and personalized experiences into medical careers and academic preparation for admissions into medical school. While much of the literature focused on pipeline programs addressing a particular racial, gender, or socioeconomic need regarding medical school admissions, this research study was focused on a pipeline program which is not specifically focused on one constituency group over another.

In Chapter 3, I provide the methodology for my research study. I begin with the justification for completing a qualitative study as my methodological approach to address my research question. I also provide an in-depth statement on my positionality, as well as epistemological perspective. I provide the context of my research study and how I selected participants for my study, and I provide an explanation of the data collection and analysis. Chapter three concludes with a discussion on how I attended to the trustworthiness in my research study.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **Introduction**

In the prior chapter of this research study, the literature was examined to better understand competency-based medical education at the various stages of medical education (undergraduate, graduate, and continuing medical education). There was also a review of the medical school admissions process (Koenig et al., 2013), as well as a discussion about the prevalence of pipeline programs, which are structured experiences and initiatives intended to provide students with exposure to the clinical environment and medical education preparation materials (Freeman et al., 2015). While the literature revealed the presence of competencies at all levels (Albanese et al., 2003), there was a lack of research on the competencies which have been established for students entering undergraduate medical education (Thomas, Kern, Hughes, & Chen, 2016).

This chapter describes the research design, a review of the context of the study, details explaining participants of the study and the way they were selected. The primary goal of this study was to understand the competencies present in the medical school applications of students who have completed a healthcare pipeline program. In order to study this research topic, the following research question guided this research:

- How are the Association of American Medical Colleges (AAMC)'s Core Competencies for Entering Medical Students displayed in the medical school application process of students who completed a healthcare pipeline program?

This chapter is organized into seven sections: (a) rationale for methodological approach; (b) positionality statement and researcher epistemology; (c) context of study; (d) participant selection; (e) data collection; (f) data analysis; and (g) trustworthiness.

### **Rationale for Methodological Approach**

Merriam and Tisdell (2016) described qualitative research as a research pathway used to understand “how people interpret their experiences, how they construct their worlds, and what meaning they attribute to their experiences” (p. 6). Contrary to quantitative research, which uses statistical methods to study numbers, theories, and facts, qualitative research attempts to address how experiences are understood, interpreted, and applied to participants’ experiences (Merriam & Tisdell, 2016). Stake (2010) described qualitative studies in five ways:

- 1) interpretive (meanings are derived from varying perspectives and understandings);
- 2) experiential (research is field oriented and is conducted through mechanisms such as participant observations, which can be a constructed reality);
- 3) situational (place and time are unique to the subject of research and there is great attention to details surrounding objects and activities in the research study);
- 4) personalistic (the research study preserves diversity through individual perceptions and issues arising from this research are emergent from the study subjects, rather than from the researchers themselves), and
- 5) triangulated (the research study is supported by various forms of evidence and relevant literature related to the research).

I chose to complete a qualitative study because I was interested in understanding how students interpreted and applied the knowledge gained from the healthcare pipeline program into their applications for admissions to a medical school in the southeastern United States. I chose this research design because I wanted to understand how students interpreted their experiences in a personalized and experiential manner. Finally, I intended to use the data collected to better grasp the interpretation of the presence of core competencies in the medical admissions process.

The goal of my research study was to understand the medical school application process of students who completed the final year of a healthcare pipeline program and who applied for medical school admissions. I selected six participants for this research study, on the basis of their involvement in the healthcare pipeline program and their successful receipt of an invitation to interview at the medical school during the 2016-2017 academic year. In completing a descriptive qualitative study, I also created and utilized a study protocol to strengthen the rigor of my study and provide a roadmap for my data collection and analysis methods (Yin, 2014), as well as the credibility of studying a sample size that contains multiple participants (Stake, 2015).

### **Positionality Statement & Researcher Epistemology**

In my current professional position, I work on the administration of over 25 programs in graduate medical education. Graduate medical education encompasses all programs and training for physicians which occur following medical school (Accreditation Council for Graduate Medical Education, 2019). Each year, we accept over 80 medical residents and fellows, who come to our healthcare system to complete



their medical training so they may become board certified to practice medicine without restrictions. While my work is solely focused on physicians at the graduate level, I have spent several years collaborating with colleagues in the healthcare system regarding the medical student pipeline. This phrase describes the various touchpoints a student may encounter in their journey to become a physician (Thames, 2014). In addition to my work in the healthcare system, I have been fortunate to volunteer additional time in two specific areas of the pipeline.

Prior to working in graduate medical education, I spent five years working in strategic planning and design for the healthcare system. Through my professional responsibilities, I worked with the healthcare pipeline program to develop a three-to-five-year strategic plan for the Academics department for the health system. The Academics department includes all activities related to education and research.

As the premiere entry point into careers in healthcare, this healthcare pipeline program functioned as an entryway for students who intended to pursue a career in healthcare, whether they were interested in clinical, administrative, technical, or support work. I initially assisted with projects and activities for the students, but as the years progressed, I took a more active role and have now served as a faculty member for the final level (or tier) of the program. I led sessions on professional development-related topics, as well as participated in mentoring and coaching students in their final year of undergraduate school.

My interest in medical school admissions began four years ago, when I was nominated to become a member of the admissions committee for a medical school.

Because of my background in administration, my role on the committee differed from that of clinicians or faculty members who served. With every interview I conducted, I sought to understand the candidate's motivation for applying to medical school and how life experiences (captured in their application materials) had shaped their motivation for pursuing a career as a physician. Because of my role with the healthcare pipeline program, I am often asked to comment on the rigor of the curriculum or the experiences a graduate of the healthcare pipeline program described in the application or personal statement.

In the past admissions cycle, the medical school began conducting research on understanding what pieces of the admissions process predict success in the first year of medical school. The committee's definition of success centered on grades from the academic material taught in the first year of medical school. During the summer of 2018, I worked with a researcher from the medical school on this research project. While assisting on this research project, I came across literature on the shift in admissions from solely focusing on statistics to understanding candidates holistically (Association of American Medical Colleges 2013; Scott & Zerwic, 2015).

Because of my role with the healthcare pipeline program and as an admissions committee member, I am very interested in understanding whether the efforts of the healthcare pipeline program are beneficial for students and allowing them to continue in their medical student journey. More specifically, I would like to provide this research study as a vehicle to spark any changes and improvements which may be made to the healthcare pipeline program and/or the admissions process of the medical school.

Throughout examination of various epistemologies as ways we legitimize the knowledge we have acquired, I found it difficult, and at some points overwhelming, to pinpoint one single predominant epistemology to which I would attribute all my experiences (Pallas, 2001). Throughout my academic and professional experiences, I can recall moments where I have used intuition and common-sense epistemologies in my knowledge sense-making. Overall, I relate mostly to the interpretivist epistemology (Crotty, 2015; Sipe & Constable, 1996).

Initially, I assumed I would identify with the positivist approach, focusing more on the world as an external source with more prescriptive direction, structured by statistical and mathematical approaches and where “knowledge should be based on what is ‘positively’ and directly observed,” (Bredo, 2006, p. 7). However, I identify more so with the interpretivist epistemology, recognizing the existence of multiple realities, which are dependent on human relationships and their unique interactions. I cannot make sense of something simply as right or wrong because of observable facts; I seek to develop deeper understanding in the nature of interactions and the existing bias which may not appear externally (Crotty, 2015). I use systematic inquiry to understand and process research in a manner in which I can locate myself in the tensions of knowledge acquisition and dissemination which may exist (Crotty, 2015; Lather, 2006).

### **Context of Study**

This research study focused on the medical school admissions process of individuals who participated in a healthcare pipeline program. I considered the site of this research study to be a virtual research space, at the intersection between the healthcare

pipeline program and the medical school. I was able to obtain information for this research study based on my access and proximity to the sites which contributed to the admissions process.

To gain the access I needed for this research study, I contacted the associate dean of admissions for the medical school and the executive director of the healthcare pipeline program. I included the associate dean of admissions' permission to engage in this research study in Appendix C. To better understand where the participants came from (the healthcare pipeline program) and where they intended to go (the medical school), I provided brief descriptions of the medical school and the health system which sponsors the healthcare pipeline program.

### **Healthcare Pipeline Program**

The healthcare pipeline program was housed within a large, private, not-for-profit health system located in the southeastern United States. An overview of the health system is provided in Appendix D. The health system merged with another health system in the state to create the largest health system in the state where it was located (Wilkinson, 2018). With over 15,000 employees, the health system created a continuum of educational activities intended to funnel students through the pipeline to pursue careers in healthcare (see Appendix E). The term 'pipeline' refers to the continuum of activities offered to students from as early as elementary school to as late as professional development training (Freeman et al., 2015; Thames, 2014). Touchpoints in the pipeline included educational programming for students in elementary school, healthcare career

fairs in middle school, and year-round exploration afterschool programs in high school (Appendix E).

The healthcare pipeline program was the flagship initiative of the health system, as depicted in Appendix F. Founded in 2010, the program provided students interested in a career in healthcare with access and resources in the health system. The program was comprised of four levels, known as tiers. Each tier focused on certain aspects of healthcare, along with career preparation. Because of the nature of this program, admissions into the program was highly competitive. In the past five years, an average of over 500 applications have been received for 50 spots the final tier of the program. Table 3.1 below highlights general information on each tier, including enrollment numbers and the focus of each tier.

Table 3.1

*Healthcare Pipeline Program General Information*

<b>Tier</b>	<b>Primary Focus</b>	<b>Duration</b>	<b>Average # Enrolled</b>
Tier 1 (rising HS seniors)	Career exploration	4 weeks	50
Tier 2 (college freshmen or sophomores)	Career exploration, assessment, and blueprinting your career path	5 weeks	30
Tier 3 (college juniors)	Research and preparation	6 weeks	35
Tier 4 (college seniors)	Implementation (medical school preparation)	7 weeks	50

## **Medical School**

The medical school conducting the admissions process utilized in my study was located in the southeastern United States. Founded in 2010, the medical school's mission was to "prepare physicians committed to improving the health and wellness of your family and your community through creative teaching, innovative research and quality clinical care" (School of Medicine Greenville, 2019a, para. 1). The medical school received preliminary accreditation in October 2011 and full accreditation in the fall of 2015 (School of Medicine Greenville, 2019b). I included additional information on the medical school in Appendix D.

The enrollment of the medical school approximates 100 students each year for four years. During the 2016-2017 admissions process, the medical school received 4,234 applications, extended interviews to 367 applicants, accepted 176 students for admissions, to yield a final class size of 105 students. These figures showed an increase from the prior three years of admissions at the medical school.

Medical school faculty included individuals from the biomedical sciences department and across all clinical departments. Medical school students completed the first two years in didactic education courses within the medical school, and the final two years completed required and elective rotations throughout the clinical departments. The table below gives some demographic information related to the faculty who are affiliated with the medical school. The biomedical sciences faculty were employed by the medical school, while the clinical faculty were employed within the departments of the health system and hold appointments within the medical school.

Table 3.2

*Demographic Information on the Research Site's Medical School Faculty, Self-Identified by Faculty Members*

	<b>Biomedical Sciences Faculty</b>	<b>Clinical Faculty</b>
Total # of employees	76	1355
Gender		
Female	36	479
Male	40	876
Race		
African American	5	39
Asian	1	72
Caucasian	56	1096
Hispanic	1	11
Native American	0	0
Unspecified/Unknown	13	137

### **Participant Selection**

I chose participants for this study based on their completion of the fourth level of the healthcare pipeline program, which is sponsored by the health system located in the southeastern United States. Because I did not interact directly with the individuals studied in this research study, I recognized their classification as research subjects. For the purposes of this research study, I referred to the research subjects as *participants*. Further

selection was made from this group of students who applied to the medical school during the 2016-2017 admissions cycle and successfully received an invitation to interview. The following table illustrates key characteristics of all students who completed the healthcare pipeline program and applied to the medical school for regular admissions. The regular admissions cycle is non-binding and runs from August through March each year.



Table 3.3

*Characteristics of Applicants Who Completed the Healthcare Pipeline Program and Applied to the Medical School during the 2016-2017 Admissions Cycle*

<b>Variable</b>	<b>Total Applicants</b>	<b>Admitted to Medical School</b>	<b>Not Admitted to Medical School</b>
Age			
≤Age 22	27	16	11
>Age 22	11	8	3
Race			
African American	2	1	1
Asian	9	4	5
Caucasian	26	18	8
Hispanic	1	1	0
Native American	0	0	0
Other	0	0	0
Gender			
Male	19	8	11
Female	19	15	4
University			
Public	31	18	13
Private	7	5	2
Mean GPA	3.775	3.793	3.747
Mean BCPM GPA	3.716	3.763	3.641
Mean MCAT %	69.35	71.05	66.25

In terms of participant selection, I employed a layered approach to sampling, more specifically a mixture of stratified purposeful sampling and criterion sampling (Patton, 2015). I chose these methods of sampling because I wanted to obtain participants with “information-rich” cases containing a wealth of information for a deeper study into my research question (p. 264). In selecting participants to use for this study, I employed Patton’s (2015) four steps of alignment: 1) determining the purpose of the research study, 2) developing a focused research question, 3) deciding which data would be important to obtain, and 4) selecting the participants for the research study (Patton, 2015).

Additionally, I wanted the research study sample to be representative of the population of the healthcare pipeline program. Individuals are selected for the healthcare pipeline program as a reflection of the diversity of the state in which the healthcare pipeline program is held. The demographic composition of the final level of the program mirrors the composition of the state in which the program is located, by way of race and gender. Table 3.4 provides the demographics of the southeastern state in which the healthcare pipeline program is held during the 2016 calendar year.

Table 3.4

*Demographics of State Conducting Healthcare Pipeline Program (estimates only)*

<b>Race</b>	<b>Gender</b>
White: 67%	Male: >45%
African American: 27%	Female: >55%
Other (including Hispanic or Latino): 6.0%	

To carry out stratified purposeful sampling, I employed criterion sampling, which is described as selecting cases that meet certain criteria laid out in a research study (Patton, 2015). I utilized this form of sampling because I wanted to examine variations among study participants, rather than only focusing on common characteristics they share. Patton (2015) noted, however, that both variations and commonalities can emerge in the data analysis. Criterion sampling was used because I established the following criteria for study participants: those who had participated in the final year of the healthcare pipeline program, who had applied to the medical school in the 2016-2017 application cycle, and who had been granted an interview for admissions.

In the initial phase of participant selection, I examined all students who matched the criteria I established for this research study. I examined a total of 38 individuals. From this stage, I eliminated participants who did not have comments provided for their multiple mini interviews included in their application. I chose this factor to use as an elimination metric, because I was interested in examining all application materials, and in the 2016-2017 admissions cycle, comments on the multiple mini-interviews were not mandatory to be provided for all multiple mini-interviews. Based on the results of this elimination, I selected six participants which mirrored the race and gender demographics provided for the state's population (see Table 3.4). In making this request, I asked them to remove the two participants I utilized in my pilot study, which was completed prior to this research study.

Table 3.5 provides a profile of each participant in this research study. Because the data was collected for the purpose of medical school admissions, I was not provided with

names for any of the participants. I was only provided with a three-digit number that differentiated the application materials between participants. Therefore, I utilized pseudonyms for each participant, to further protect the identity of these applicants to medical school.

Table 3.5

*Research Study Participant Information*

<b>Participant</b>	<b>Age</b>	<b>Race</b>	<b>Gender</b>	<b>Application Process</b>	<b>University</b>	<b>GPA</b>	<b>MCAT %</b>	<b>Academic Major</b>	<b>Admissions Status</b>
Nathan	≤ 22	Caucasian	Male	Early Decision	Public	3.34	42	Health Science	Not accepted
Jane	≤ 22	Hispanic	Female	Regular Decision	Public	3.92	60	Biology	Accepted
Rachel	≤ 22	Caucasian	Female	Regular Decision	Public	3.66	94	Biomedical Engineering	Accepted
Paul	≤ 22	Caucasian	Male	Early Decision	Public	3.60	45	Biology	Accepted
Sarah	≤ 22	Caucasian	Female	Early Decision	Private	3.82	49	Biology	Accepted
Mary	≤ 22	African American	Female	Regular Decision	Public	3.54	49	Biology	Not accepted

Along with completing a descriptive qualitative study (Stake, 2006), I created and utilized a study protocol to ensure rigor in this research study, as well as providing a roadmap for the data collection and data analysis procedures. This study protocol was an adaptation of a case study protocol Yin (2014) described as a tool for ensuring rigor in research studies. In order to determine an adequate number of participants for this qualitative descriptive study, I employed Stake's (2006) recommendation to examine between four and ten participants. For this research study, I chose to examine six participants.

Patton (2015) regarded the nature of qualitative study as more of a focus on the depth of information of study, rather the generalizability of quantitative study. Therefore, because the focus of this research study was to provide an in-depth examination of the presence of core competencies among individuals, I focused on six individual participants. After eliminating applications which did not have qualitative data for the multiple mini-interviews, I used the criteria of race and gender percentages from Table 3.4 to select six participants for this study. I requested the office of admissions provide all application materials for those who represented the following population statistics:

- Four female and two male participants, who represented the following races:
  - four Caucasian participants,
  - one African American participant, and
  - one participant of an "Other" race category, which was inclusive of the Hispanic, Asian, or Other race category.

## **Data Collection**

Data collected on each participant included the (a) personal statement; (b) secondary application; (c) interview comments from individual interviews; (d) interview comments from the multiple mini interviews; and (e) the letters of recommendation. I collected the data following the 2016-2017 medical school admissions cycle, so I was able to review data collected on each applicant who completed the healthcare pipeline program and who was invited to interview for the medical school. I gained access to the data by contacting the medical school office of admissions. After explaining the purpose of my study, the admissions office approved my request (see Appendix C) and provided me hard copies of de-identified application packets for the individuals who completed the healthcare pipeline program.

There were no markers of identification on the data I received, except for a unique applicant number, which was assigned by the office of admissions for the purposes of this qualitative study only. Applicant characteristics obtained from the American Medical College Application Service (AMCAS) application included age; self-designated gender; race and ethnicity; self-designated disadvantaged (DA) status (yes/no); cumulative undergraduate grade point average (GPA); total Medical College Admission Test (MCAT) score; and application year (Jerant et al., 2019).

To better understand the data collected, I provide the table below to give brief information on the data collected, including the author who composed each form of data. Following the table, I provide a definition and significance of the data collected.

Table 3.6

*Applicant Data Collected and Characteristics*

<b>Form of Data</b>	<b>Author of Data</b>	<b>Characteristics</b>
<ul style="list-style-type: none"> <li>• Personal Statement</li> </ul>	Applicant	Limited to a maximum of 5,300 characters
<ul style="list-style-type: none"> <li>• Secondary Application</li> </ul>	Applicant	Guided questions crafted by medical school to learn more about applicant
<ul style="list-style-type: none"> <li>• Individual Interviews</li> </ul>	Interviewers	Individual interviews, based on full application and patient-physician situations
<ul style="list-style-type: none"> <li>• Multiple mini interviews (MMIs)</li> </ul>	Interviewers	Scenario-based activities, seeking to observe characteristics of applicant
<ul style="list-style-type: none"> <li>• Letters of recommendation</li> </ul>	Individuals selected by the applicant	Written narrative, submitted by individuals selected by the applicant, to discuss the applicant's characteristics in greater detail, based on personal interaction with candidate

**Personal Statement**

The personal statement is referred to as a personal comments essay, according to the Association of American Medical Colleges (AAMC) and must not exceed 5,300 characters (Association of American Medical Colleges, 2018). This narrative is intended to creatively allow the applicant to convey motivations for applying to medical school, their commitment to a career in medicine, and information that has not been displayed in



other aspects of the application. Applicants are advised to also use the personal comments essay as an avenue to address “unique hardships, challenges, or obstacles that may have influenced educational pursuits” and “significant fluctuations in the academic record that are not explained elsewhere” in the application (p. 54).

### **Individual Interviews**

While the format of these experiences may vary from one medical school’s admissions process to the next, the individual interview is conducted between the applicant and a member of the admissions committee of the medical school. These interviews may be structured or unstructured in nature. Unstructured interviews are casual, informal, and rely on the conversation at hand to drive the direction of the interview (Patrick, Altmaier, Kuperman, & Ugolini, 2001). These interviews “lack objective scoring criteria,” and may be susceptible to interviewer bias in the way they are scored (p. 66). Structured interviews, on the other hand, provide a more constant and consistent basis for questions to the applicants, as well as an objective scoring matrix for each applicant (Patrick, Altmaier, Kuperman, & Ugolini, 2001; Foster & Godkin, 1998; Tibbles, 1993).

Regarding the medical school considered in this qualitative study, the focus of the individual interview was based upon information provided in the applicant’s medical school file, including any supplementary material which the applicant brought to the interview to update their files. For the first structured interview, applicants were questioned about their motivations to apply to medical school, their experiences working on teams and in the healthcare setting, and their perspectives on global healthcare issues.

In the second structured interview, applicants were asked to consider patient care scenarios and how they would respond as a physician. These scenarios may be referred to as situational judgement tests (Lievens, 2013). The purpose of situational judgement tests is to understand the base knowledge an applicant may be bringing into medical school prior to any formal educational training. In addition, understanding applicants' "interpersonal procedural knowledge" may provide insight into an applicant's future interaction with actual patients (p. 183).

### **Multiple Mini-Interviews (MMIs)**

Multiple mini interviews (MMIs) are shortened interviews which are based on the structure of the objective structured clinical examination (OSCE) that is administered in the medical school curriculum (Eva, Reiter, Rosenfeld, Trinh, Wood, & Norman, 2012). These experiences situate the applicant to take the role as the physician in a scenario involving a patient and a healthcare decision that must be made. Because of the realistic nature of the scenarios presented in the MMIs, research has shown a relationship between the performance on MMIs and performance on medical school OSCEs (Eva, Reiter, Trinh, Wasi, Rosenfeld, & Norman, 2009; Reiter, Eva, Rosenfeld, & Norman, 2007; Eva, Rosenfeld, Reiter, & Norman, 2004).

During the medical school admissions day, the applicant was presented with multiple scenarios and a limited time to read the scenario and carry out the appropriate decisions with a standardized patient. A standardized patient is a trained individual who utilizes a "pre-established script to portray the symptoms of a condition in a clinical setting" (Larsen, Butler, Lawson, & Roediger, 2012, p. 411). Standardized patients are

provided with a structured rubric by which they evaluate the communication skills of the applicant, as well as other traits which are evaluated during the timed encounter with the applicant (MacLean, Kelly, Geddes, & Della, 2017; Ryan, Walshe, Gaffney, Shanks, Burgoyne, & Wiskin, 2010). Each MMI is structured with a prompt, summarizing the situation that the applicant must address. The manner by which the applicant takes part in the MMI may be structured or unstructured, depending on the flow of the conversation with the individual who is involved in the MMI. I examined the data collected from the standardized patients' numerical rubric scoring, as well as the comments left on each applicant's encounter with the standardized patient.

### **Letters of Recommendation**

The Association of American Medical Colleges (AAMC) defines letters of recommendation as letters of evaluation which assess "qualities, characteristics, and capabilities" (Association of American Medical Colleges, 2018, p. 46). Applicants seek out individuals to compose and submit these letters on behalf of the applicant. An application to medical school can have up to 10 letters submitted for the applicant. Types of letters submitted may include (1) a committee letter, sometimes referred to as the composite letter, which is an institutional evaluation of the candidate written by the "pre-health committee or advisor" (p. 46); (2) a letter packet, which includes many letters from the institution but not written by the pre-health advisor, or (3) individual letters submitted by "single letter authors" (p. 47).

Applicants have multiple letters of recommendation attached to their applications. In this qualitative research study, I examined the letters of recommendation individually,

since the authors of the letters may or may not have professional or personal communication with one another. I also considered the nature of the relationship between the applicant and the recommendation authors (i.e. whether they were a personal, academic, or professional connection).

### **Document Collection**

Document review as a qualitative research method is focused on a thorough review and evaluation of documents in a research study (Bowen, 2009). Merriam (1988) defined the use of documents to “uncover meaning, develop understanding, and discover insights relevant to the research problem” (as cited in Bowen, 2009). Documents may be provided in print form or available in electronic form. While the use of documents as data sources varies among qualitative research methods, researchers argued for the importance of document analysis as a form of triangulation of data, allowing for multiple forms of data (including the use of documents) to guide research studies and strengthen findings (Merriam & Tisdell, 2016; Stake, 2010).

Bowen (2009) outlined five primary uses of documents: (1) for contextual explanation in a research study; (2) to highlight questions or situations which need attention during the research study; (3) providing “supplementary research data” (p. 30); (4) to illustrate changes or development of concepts or initiatives; and (5) to “verify findings or corroborate evidence from other sources” (Bowen, 2009, p. 30). In addition to collecting the various documents which comprised the medical school application, I also collected documents related to the health system and the medical school. I provided more detail about these documents in the table below.

Table 3.7

*Documents Obtained for Further Support of Research Study*

<b>Document</b>	<b>Use of the Document</b>
Healthcare Pipeline Program white paper	<p>Provided historical data on the program</p> <p>Illustrated changes and program improvements over time</p>
Healthcare Pipeline Program accreditation documentation	<p>Provided historical data on program requirements</p> <p>Gave a contextual explanation of program requirements</p> <p>Illustrated changes and development of curriculum credited courses</p>
Healthcare Pipeline Program media articles	<p>Provided supplementary research data to supplement what was provided in application materials as an explanation of the program</p>
Medical school website	<p>Contextual, historical explanation of site</p> <p>Illustrated changes and development of curriculum credited courses</p>
Medical school admissions data report	<p>Verified characteristics and attributes of incoming accepted class of students</p>
AAMC Core Competencies for Entering Medical Students document	<p>Provided historical data on the program</p> <p>Illustrated changes and program improvements over time</p>

Provided supplementary research data on  
competencies  
Illustrated the development of competency  
characteristics  
Served as a verified finding from a prior study to  
create competencies as a guide to medical school  
admissions process

Regarding the analysis of these documents, I followed Bowen's (2009) three steps for analysis, which include skimming over the text, reading it in full depth, and providing interpretation of the text. With the documents outlined above, I completed a preliminary content analysis over the text. Content analysis involves data organization into categories which address the goals of the research study (Bowen, 2009). Content analysis also focuses on the meaning of the text in the context of how the text is presented as a complete document (Merriam & Tisdell, 2016). The content analysis I completed involved understanding the purpose of the healthcare pipeline program in more detail and how the curriculum aligned with the tenets and mission of the medical school.

In addition to content analysis, I completed thematic analysis over the documents I gathered for this research study. Thematic analysis is defined as recognizing patterns observed in the documents and formulating categories of analysis based on the emerging themes (Bowen, 2009). Thematic analysis involves creation of codes and categories for the data. Stake (2010) defined this method of coding as "sorting all data sets according to

topics, themes, and issues important to the study” (p. 151). Stake (2010) also noted that coding functions more for interpretation of the data than for setting up the organizational structure of the findings report. Coding may evolve and develop over time, due to the nature of the data being reviewed. Because I reviewed documents as well as individual data in this research study, I developed a coding framework for both types of documents (see Appendix G). The coding framework was derived from the conceptual framework, prior to any coding completed on the data.

### **Data Analysis**

In this research study, I completed a secondary data analysis. Glass (1976) defined this form of analysis as “the re-analysis of data for the purpose of answering the original research question with better statistical techniques or answering new questions with old data” (p. 3). For this research study, the data collected were originally intended for admissions to the medical school and not specifically for the purposes of this research study. The data were analyzed with framework analysis. In this section, I define this form of analysis.

### **Framework Analysis**

Framework analysis, introduced by Ritchie and Spencer (1994), is a form of thematic analysis which may be utilized after all data collection or to perform data analysis during data collection (Srivastava & Thomson, 2009). Framework analysis is comprised of the following five steps: (1) familiarization, (2) identification of thematic framework, (3) indexing, (4) charting, and (5) mapping and interpretation (Ritchie & Spencer, 1994). In the first stage, familiarization, I read through all data collected in my

initial phases of data collection. I took notes of emergent themes and recurrent topics. Ritchie and Spencer (1994) described this phase as understanding the situational and historical aspects of the research study and familiarizing oneself with the quantity and breadth of data.

In the second stage, identifying a thematic framework, Ritchie and Spencer (1994) acknowledged the presence of prior frameworks which may dictate the direction of the framework. They stressed the importance of using the data to develop a working framework and noted that this framework may not be the final framework used in the data analysis (Srivastava & Thomson, 2009). Using notes made in the first stage of the framework analysis, I focused the thematic framework on the core competencies framework provided by the Association of American Medical Colleges (2019b). In addition to using the descriptions provided by the Association of American Medical Colleges (2019b), I also utilized the descriptors and notes made from my initial observations and memoing during the first round of review of the data.

The third stage of framework analysis, indexing, involves categorization of the data into themes (Srivastava & Thomson, 2009). Although Ritchie and Spencer (1994) suggested the use of numerical coding and annotation, I utilized NVIVO Software to achieve the same task, by creating nodes which represented the themes and assigning data which corresponded to the themes to fall under the nodes. The purpose of this stage in my data analysis was to better understand whether certain core competencies had greater presence in the data, as well as whether the manner by which the core competencies were represented in the data was explicitly stated or implicitly stated. I wanted to understand



whether these core competencies were defined in the data collected or implied by the examples provided.

Ritchie and Spencer (1994) identified the fourth stage of framework analysis, charting, as the time in which the data could be graphically represented in chart form. The unique quality of this phase is that the data is taken from within the text of the data collected and presented in a chart form (Srivastava & Thomson, 2009). Because the data would leave its original context, Ritchie and Spencer (1994) noted the importance of keeping the data in the same order throughout the process of data analysis, so as to ensure each participant's unique data could be preserved and not mixed with another participant's data.

Ritchie and Spencer's (1994) final step in framework analysis involves mapping and interpretation of the data charts from the fourth step. In this stage, I examined the major themes and subthemes which emerged from the individual participant cases studied. I defined key themes, concepts, and synthesized associations between information categories and emergent themes which resulted in the presence or absence of the core competencies, evidenced through the data collection process.

### **Trustworthiness**

To ensure trustworthiness in this qualitative study, I utilized four criteria from Lincoln and Guba (1985): (1) credibility, (2) transferability, (3) dependability, and (4) confirmability. Credibility seeks to understand the notion of internal validity, which attempts to assure the researcher that "their study measures or tests what is actually intended" (Shenton, 2004, p. 64) and how findings from the research align with reality

(Merriam & Tisdell, 2016). To ensure credibility, I employed member checking in the initial review of the curriculum of the healthcare pipeline program and the identified core competencies. Member checking involves providing the data sources with the ability to review and provide corrections to the observations made by the researcher (Stake, 2010; Merriam & Tisdell, 2016). Because I was working with the curriculum of the healthcare pipeline program, I contacted the director and coordinator of the program to review the assignment of the core competencies towards the sessions and courses within the curriculum of the healthcare pipeline program. I asked for the leadership of the healthcare pipeline program to complete the same activity and we met to discuss and compare the designations made for each curriculum component (Appendix H).

Transferability relates to the concept of external validity, which Merriam and Tisdell (2016) recognized as “the extent to which the findings of one study can be applied to other situations” (p. 253). Shenton (2004) noted the difficulty in applying the results and findings of a qualitative study (which may be narrowly focused on a small population and phenomenon) to other areas and populations. Lincoln and Guba (1985) offered an additional perspective on transferability and recognized that while it is difficult to apply results and findings from one study to the next, the researcher had the responsibility to ensure that adequate information is provided to the reader to transfer the contextual information from one study to the next. Shenton (2004) argued in support of Lincoln and Guba’s (1985) notion that thorough descriptions of research must be provided so researchers have an adequate understanding of the research question and design (Shenton, 2004).

Merriam and Tisdell (2016) further defined contextual information as “a description of the setting and participants of the study, as well as a detailed description of the findings with adequate evidence presented in the form of quotes from participant interviews, field notes, and documents” (p. 257). Thus, I have laid out a detailed description of the context of my study and have provided several appendices with supplementary information to explain this research study in detail. In chapter four of this research study, I presented the participants of this research study with directly quoted information from the data collected.

Merriam and Tisdell (2016) recognized another characteristic of ensuring transferability, which is related to variability of research studies. They identified three advantages to selecting a variety of participants to study: (1) an increased level of diversity among participants; (2) identification of common patterns of observations or characteristics across participants, and (3) the increased amount of applicability because of the increasing number of diverse participants. In this research study, I addressed transferability by examining multiple participants (represented by the individuals in the research study). Studying multiple participants gave me an opportunity to examine common and unique phenomenon across the data gathered about each participant.

Dependability addresses the issue of reliability, namely whether the research study may be replicated with the same methods and participants present (Shenton, 2004). Lincoln and Guba (1985) argued the interconnectedness of credibility and dependability, noting that both levels of trustworthiness require a high level of detail and explanation. To ensure dependability in this research study, I created a study protocol (see Appendix

I). Adapted from Yin's (2014) structure for a case study protocol, the document I created provided a roadmap to three important aspects of this research study: (1) the study research design, (2) the methods of data collection, and (3) explanation of the type of research study (Shenton, 2004). Yin (2014) argued the significance of a protocol is to increase the reliability of a study through its focus on all data and procedures for a single case examined in a study. While I did not complete a case study, I used a protocol to standardize the way I approached the data for each of my study participants.

Confirmability is related to objectivity, which ensures that "the work's findings are the result of the experience and ideas of the informants, rather than the characteristics and preferences of the researcher" (Shenton, 2004, p. 72). To attend to the confirmability of this research study, I engaged in self-auditing as I worked with the data collected. I kept reflective memos while coding the data, to capture my thoughts and ideas as I worked with codes and developed new codes as needed.

Additionally, I employed triangulation, by working with multiple forms of data throughout the research study to ensure consistency (Stake, 2010). Patton (2015) argued in support of triangulation, and he noted that triangulation tests for the consistency of similar results based off multiple, varied sources of data. In this research study, I utilized data gathered from the participant (secondary application and personal statement), along with data provided by external interview committee members (individual interviews and multiple mini-interviews), as well as data collected from non-medical school-related individuals, not associated with the admissions process for medical school (letters of recommendation).

## **Chapter Summary**

In this chapter, I provided my methodological approach for data collection and data analysis that enabled me to address the core competencies present in the medical school admissions materials of students who have completed a healthcare pipeline program. I discussed my positionality as a researcher who works directly with the healthcare pipeline program. I also shared my experiences serving on the medical school admissions committee. I gave rationale for establishing my research as a qualitative study with elements of case study analysis. I provided an overview of the context of the study, giving an explanation to my use of a layered approach of purposeful, stratified sampling of participants. Finally, I defined and described the use of document and framework analyses during my data analysis process and I elaborated on the ways I addressed trustworthiness in this research study.

In the next chapter, I provide an in-depth explanation of my data analysis and identify key themes that emerged from this research study. I will begin by providing background information on the six participants of the study, utilizing direct quotations from the data collected to describe the study participants. I will discuss emergent themes and pertinent information on themes and sub-themes. Finally, I will give a summary of the overall study findings and results.

## **CHAPTER FOUR**

### **RESULTS AND FINDINGS**

#### **Chapter Overview**

The purpose of this research study was to understand the presence of core competencies displayed in the admissions materials of students applying for medical school who have already completed the final year of a healthcare pipeline program. The research question which guided this study was as follows:

- How are the Association of American Medical Colleges (AAMC)'s Core Competencies for Entering Medical Students displayed in the medical school application process of students who completed a healthcare pipeline program?

To address this research question, I completed a descriptive qualitative study of six participants who met the criteria I established for participation in the research study. I examined five pieces of data for each applicant: 1) individual interview comments; 2) letters of recommendation; 3) multiple mini interview (MMI) comments; 4) personal statement; and 5) excerpts from the secondary application. Upon receiving the data, I began the framework analysis process, involving five different steps of analysis for my data. All data were analyzed and coded using thematic coding methods. I created an initial coding framework (Appendix J), based on the competency model created by the Association of American Medical Colleges (2019b). I refined my codebook, following the initial phase of framework analysis, known as familiarization.

Following the indexing (coding) phase of framework analysis, I completed the charting phase and studied the coded data. As a result, I identified four common themes that addressed the coded data. I further refined my codebook to encompass these themes and additional codes that were observed and noted beyond the initial codebook. I utilized the final version of my codebook (Appendix K) to identify my results and findings from my research study. I created sections in this chapter to address each of the observed themes from the data.

This chapter is organized into the following nine sections: (1) pilot study; (2) the participants; (3) document analysis; (4) establishing themes through framework analysis; (5) theme: academic performance and excellence; (6) theme: connecting through communication skills; (7) theme: fostering relationships through service and leadership; (8) theme: personal connections in medicine; and (9) chapter summary.

### **Pilot Study**

Four months prior to completing this research study, I conducted a pilot study to examine the presence of core competencies in medical school applications for two students who completed the healthcare pipeline program. I elected to complete this pilot study to inform my methods for my full research study. In the pilot study, I explored which competencies were present in students' applications and how the competencies exhibited in the materials submitted by students compared to the materials submitted by external individuals. Two research questions guided the pilot study:

- 1) How do student participants in a summer healthcare program display the Association of American Medical Colleges (AAMC)'s Core Competencies in the medical school application cycle?
- 2) How do the competencies displayed in written applications and personal statements of students applying to medical school compare to competencies displayed in interviews and letters of recommendation provided by external individuals?

The pilot study was conducted using data provided by the office of admissions from a medical school in the southeastern US. Data utilized in the pilot study were originally submitted for medical school admissions in the 2016-2017 admissions cycle. Data analyzed included the participant's medical school application, the personal statement, and letters of recommendation. Two participants were randomly selected from the total number of participants of a summer healthcare pipeline program who applied to the medical school. One participant was classified as a high achiever, scoring in the top 75th percentile on the MCAT and with a strong GPA. The other participant was classified as a low achiever, scoring in the less than 25th percentile on the MCAT and with a lower GPA. The competencies I chose to code during my data analysis came from the top three competencies which are taught in the curriculum of the summer healthcare pipeline program (Appendix H).

The results of the pilot study indicated a strong presence of core competencies in the materials they submitted, as well as the materials submitted by external individuals (i.e. the letters of recommendation). The high achiever applicant contained more



competencies reflective of activity involvement than in academic experiences. The low achiever applicant focused more on overcoming academic hardships through resilience and adaptability.

As a result of the pilot study, I revised and further clarified my research study. I elected to focus on a descriptive qualitative study which examines the presence of the core competencies in the application process. I also revised my participant selection procedures, to reflect the population demographics of the state in which the medical school is located. My dissertation builds upon the changes I made in my pilot study by increasing the number of participants from two to six participants. I also added two new pieces of data to examine: a portion of the secondary application and the interview comments that are written on a student's interview day. Additionally, I further defined my study research designs and data analysis techniques.

### **Participants**

Participants for the full research study were selected from the pool of applicants applying to medical school in the 2016-2017 academic year. Because I did not directly interact with the individuals who were in this research study, I acknowledged they are considered study subjects. For the purposes of this research study, I am using the term *participants* to refer to the research subjects outlined in this study.

The medical school is located in the southeastern United States. Annually, the medical school receives over 3,500 applications and selects roughly 10-12% to invite for an in-person interview day. Stratified purposeful sampling and criterion sampling were

used in this research study (Patton, 2015). Six participants were selected based on the following criteria:

- (1) completion of the final level of the healthcare pipeline program;
- (2) successful submission of an application for medical school;
- (3) invitation to complete an in-person interview;
- (4) comments provided for multiple mini interviews; and
- (5) racial and gender sampling, correlated to the racial and gender composition of the state in which the healthcare pipeline program took place.

To select participants according to the criteria described, I communicated with the office of admissions for the medical school. I composed an email to the manager of admissions requesting a sampling of participants. Due to the small number of students to select from, I asked the office of admissions to diversify my sample, based upon the racial and gender percentages provided in Table 3.4.

### **Brief Introduction of Participants**

#### **Nathan.**

Nathan is a 22-year-old Caucasian male who was born in the midwestern United States (US). He graduated in December 2016 from a public research institution in the southeastern US. He majored in Health Sciences and graduated with an overall 3.34 grade point average (GPA). Nathan took the medical college admissions test (MCAT) once and received a score in the 42nd percentile, according to the national mean.

Nathan reported in his application that his family consists of both of his parents and three siblings. Neither his father nor his mother completed degrees in the medical

field, but they work in fields related to religion and computer science. Nathan is the oldest sibling in his family, with three younger siblings ranging in age from 15 to 19 years old.

Nathan built his personal statement by recalling his personal exposure to medicine, when he sustained a sports injury requiring medical attention. Following his surgery and rehabilitation, Nathan felt motivated to pursue further clinical experiences, by shadowing physicians in various specialties. He focused on building relationships with his peers, colleagues, and mentors throughout these experiences. As a result of the clinical experience exposure, Nathan changed his major, but suffered academically with the more difficult workload. In his personal statement, he addressed the academic difficulties he faced, noting that in his struggles, his classwork felt like an “unrewarding experience” (Nathan, personal statement, 2016). Despite initial struggles, Nathan was able to adjust and succeed, even commenting that his “increased success in class is not due to a growth in dedication and hard work, as one might expect, but an increased understanding of how I learn as a student” (Nathan, personal statement, 2016).

Nathan is described in his letters of recommendation as someone who is a “hard worker and is consistent in his commitments” (Nathan, letter of recommendation, 2016). His letters reflected his passion for serving others, his intelligence and his maturity. Referencing his ability to create and foster relationships, one of his recommenders described Nathan in the following manner:

He has been able to empathize with the guys he meets and shows a great balance between caring for them and not letting it weigh him down..[he] demonstrates

incredible time management skills and a responsibility you don't normally find in a college student. (Nathan, letter of recommendation, 2016)

During Nathan's interviews, he addressed his academic shortcomings, emphasizing the turnaround on his grades between his first and third year of college. His interviewers noted Nathan's resiliency, despite poor academic performance at the beginning of college. During the round of multiple mini interviews, his evaluators noticed Nathan's ability to present solutions, while staying attuned to the patient's needs:

I noticed you presented a plan (working out for stress reduction) and then asked for my input and scheduled our first workout. This made me feel you cared for me and considered my thoughts and feelings before engaging in a plan to assist me.

(Nathan, multiple mini interview, 2016)

### **Jane.**

Jane is a 22-year-old female who was born in the northwestern US but currently lives in the southeastern US. She self-identified her ethnicity to be of Hispanic, Latino, or of Spanish origin. She graduated with a bachelor's degree in biology from a public research institution in the southeastern US. Jane excelled in her undergraduate years, receiving a 3.94 GPA and an MCAT score within the 60th percentile, according to the national mean.

Jane is the oldest of three girls in her family. Her father completed a bachelors degree and is currently employed in a management position. Her mother completed a high school diploma and is a homemaker. Jane's immediate younger sister is in college, while her youngest sister is in high school.

In her personal statement, Jane recalled memorable clinical experiences as her motivation to become a physician. While working in Nicaragua, Jane's observations of the poor clinic conditions reminded her that, while she wished she could administer medical treatments, she knew she "was nothing more than a college student in a pair of scrubs" (Jane, personal statement, 2016). Jane related her Nicaraguan experience with serving in local community clinics while she was in college, stating her revelation that "a lack of healthcare and the need for medical intervention are not unique to faraway countries but instead exist in our own backyards" (Jane, personal statement, 2016). Jane reflected on her professional work experience as a Nurse Technician, which taught her how to work collaboratively to deliver patient care. She also spent one semester completing medical research on patients, from admissions to diagnosis.

Jane's recommendation letters shared common themes of describing her positive demeanor, effective communication, and ambitions within her studies. One professor commented that Jane "defly demonstrates an ability to master a concept before writing/speaking/or otherwise communicating about it with others" (Jane, letter of recommendation, 2016). Jane's letters were authored from many of her professors, as well as one letter from her previous employer while she was a nurse technician. Her English teacher summarized Jane's primary qualities in the following way:

Quite simply, Jane is an exemplary, very mature human being. She's great in every superlative way that I could think to contextualize her for you within this letter. And I am all too happy to stake my own professional reputation on the

merits of what she will provide and represent if granted a medical school opportunity.” (Jane, letter of recommendation, 2016)

Jane completed two individual, structured interviews. Her interviewers were impressed by her accomplishments academically and the comments provided in her letters of recommendation. During her multiple mini-interviews, Jane received positive comments regarding her demeanor, but there were differences in the interviewers’ comments regarding her confidence. One interviewer rated her confidence positively, and another interviewer commented Jane was “very confident but not empathetic and that made me feel I was at fault” during the suggested medical intervention in the interview (Jane, multiple mini interview, 2016).

### **Rachel.**

Rachel is a 21-year-old Caucasian female from the mid-Atlantic US. She attended a public research institution in the southeastern US. Rachel graduated with a bachelors degree, majoring in biomedical engineering and a double minor in Chemistry and Theatre. She achieved a 3.66 GPA and an MCAT score in the 94th percentile, having taken the standardized test only once.

Rachel is the elder of two children in her family, having a younger brother who is two years younger. Her father completed a doctoral degree and is in the engineering profession. Her mother completed some college but did not receive a college degree. She is currently working in the business and finance profession.

With her background in theatre, Rachel began her personal statement likening the role of a physician to the role of an actor, which requires spending time learning the

situation before coming to any conclusions. She referenced her first year participating in the healthcare pipeline programs as one in which she “felt an overwhelming sense of purpose and belonging, and the first [time she] set sights on a career in medicine” (Rachel, personal statement, 2016). Returning to the final year of the healthcare pipeline program, Rachel recalled the experience “cemented my desire to become a doctor by showing me in depth the human aspect of the profession through shadowing” (Rachel, personal statement, 2016). She focused on memorable physician shadowing experiences and the lessons she learned from each patient encounter.

Rachel’s letters of recommendation described her as having “impressive intellectual curiosity,” being a “dependable and approachable person,” and a “rare example of a bright and hardworking undergraduate student with outstanding future” (Rachel, letter of recommendation, 2016). Her letter from the theatre praised her for being able to navigate roles of leadership as well as working in the crew of many theatrical shows. In completing research for the department of Chemistry, Rachel was described as a researcher who took initiative in the lab, resulting in co-authoring peer reviewed publications in top Chemistry journals.

Rachel’s individual interviews recalled her interest in medicine evolving from fear of medicine to full immersion into the medical career and field. Her interviewers described her as “very confident; very heartfelt, poised; good communication skills” (Rachel, individual interview, 2016). One interviewer appreciated Rachel’s ability to ensure medicine was the right track for her, commenting that she “really explored into all the options before jumping to decision to be a doctor” (Rachel, individual interview,

2016). During her multiple mini interviews, the standardized patients felt Rachel was “pleasant and approachable” and would be able to positively interact with patients (Rachel, multiple mini interview, 2016). One standardized patient commented on Rachel’s demeanor: “I felt empathy from the applicant, and it gave me confidence they would do all they could to help me” (Rachel, multiple mini interview, 2016).

**Paul.**

Paul is a 22-year-old Caucasian male who was born and still resides in the same southeastern city in the US. He completed an associate of science degree before transferring to a public research institution and completed a bachelors of science degree, majoring in Biology. He received an undergraduate GPA of 3.57 and scored within the 45th percentile on the MCAT, after taking the exam twice.

Paul is the elder of two siblings. His parents completed associates degrees, and his father is employed as a factory worker. His mother serves as an elementary school teacher aide. In his application, Paul identified affirmatively in the socioeconomic disadvantaged status, explaining the hardship he and his family experienced while raising his brother who was diagnosed with cystic fibrosis. He explained his hardship by stating he “did not have the same resources as most of my peers, such as the knowledge of how to pursue medicine within my family” (Paul, AMCAS application, 2016).

Paul’s personal statement provided in-depth discussion on personal and professional activities that motivated him to pursue a medical career. He completed an internship with the local coroner’s office and the morgue. His experience afforded him an



opportunity to encounter medicine “in a hands-on way and appreciate all facets of medicine, even those that are commonly forgotten” (Paul, personal statement, 2016).

During his involvement in the healthcare pipeline program, he encountered a patient in the neonatal intensive care unit who was diagnosed with cystic fibrosis (CF). Living with a brother who was diagnosed with CF, he observed how his brother’s physician exhibited compassionate care with everyone in the family, including Paul. He applied the lessons of empathy and compassionate care towards his summer work at a camp for children with disabilities. His experience reinforced his desire to be genuine with everyone at all times, as he stated, “what I do when people are not looking is just as important what I do when I am front and center” (Paul, personal statement, 2016).

Paul received letters of recommendation from his mentors in academic, professional, and extracurricular activities. He was described as someone who was “striving to always better himself” by his lab advisor (Paul, letter of recommendation, 2016). Within his role at the coroner’s office, his recommender highlighted his “eagerness, extreme compassion and willingness to help” resulted in him receiving “respect from our staff as well as the many different agencies and professionals” that work with the coroner’s office (Paul, letter of recommendation, 2016).

During his work with the camp for children with disabilities, his recommender stressed Paul’s ability to “show others concern and respect while displaying integrity” in a team environment (Paul, letter of recommendation, 2016). Paul’s level of service for others was summarized by one recommender in the following manner:

Paul does not initially stand out from the crowd. He does not have that flashy smile that attracts all to his side or the brain power to instantly understand anything that is thrown at him. What Paul does possess is something far more meaningful...a desire to better himself and serve others (Paul, letter of recommendation, 2016).

Paul's interviewers commented on his family upbringing, noting his parents' lack of knowledge on how to navigate through the journey to medical school. Coupled with his brother's CF diagnosis, they recognized Paul's resilience despite the lack of support. While they recognized he did not have the strongest academic record, one interviewer felt he had a "fair amount of insight and commitment" through his experiences at the summer camp and with the coroner's office (Paul, individual interview, 2016). Paul's multiple mini interview comments referred to him as "professional and reassuring" and that the standardized patient did not feel there were any concerns with "his ability to interact with patients" (Paul, multiple mini interview, 2016). One standardized patient, however, related an opposite experience with Paul's professionalism, noting "I felt the high fives in the beginning and end [of the MMI] weren't appropriate for the situation" (Paul, multiple mini interview, 2016).

### **Sarah.**

Sarah is a 22-year-old Caucasian female who was born and currently resides in the southeastern US. She graduated from a private liberal arts institution in the southeastern US. Majoring in Biology and minoring in Chemistry, Sarah graduated with a 3.81 GPA and an MCAT in the 73rd percentile. She took the MCAT exam twice.

Sarah has one younger sister who is in high school. Both her mother and father graduated from the same undergraduate institution, which was a public institution's satellite campus in the southeastern US. Her mother received a master's degree and is currently employed as a primary teacher, while her father completed a bachelor's degree; Sarah did not specify his profession.

Sarah's personal statement began with an introduction to her love for equestrian life. Through her story of Eli, a horse who was saved from slaughter, she described lessons of "patience and perseverance," and breaking down walls to gain Eli's "trust and respect" (Sarah, personal statement, 2016). She further described several of her traits through her work with Eli, noting her relationship with the horse produced "empathy, emotional intelligence, compassion...and helping others, especially those most vulnerable and with the greatest need" (Sarah, personal statement, 2016). Sarah continued her personal statement relating to a shadowing experience with a physician who had the ability to "empathize and connect with his patient on a deeper, more personal level" (Sarah, personal statement, 2016). She concluded her personal statement reinforcing her motivation to become a physician, by summarizing traits of compassion and dedication she observed in the physician shadowing experience and horse training.

Through her letters of recommendation, Sarah was described several times as "one of our top students in the department" who is "diligent, thoughtful, mature, and academically gifted" (Sarah, letter of recommendation, 2016). Her motivation was described as someone who sought answers and assistance beyond the classroom, in order

to fully understand and grasp conceptual material in her courses. She was also identified for her leadership and service abilities.

Of all the participants in my research study, Sarah had one letter of recommendation which contained constructive criticism of her performance. Citing a pilgrimage Sarah traveled on during a semester in Europe, the recommender praised Sarah for her “inner desire to do her best in everything that she undertakes” (Sarah, letter of recommendation, 2016). In fact, her recommender shared these comments:

Based on my impressions in and out of the classroom, I believe that Sarah possesses many qualities that will serve her well both in medical school and in a medical career: a desire not just to succeed but to excel in what she does; a[n] intense sense of determination ultimately tempered by realism; and a sensitivity to group dynamics and individual moods that allow her to have a positive impact on those around her (Sarah, letter of recommendation, 2016).

To better understand the use of the phrase “tempered by realism,” Sarah’s recommender offered the follow sentences on how Sarah might be able to improve:

If I were pressed to identify an area in which Sarah can improve, it would be to not take it personally when others disagree with her or when her plans go awry due to outside circumstances. Both of these situations emerge from conditions that are beyond her control, and she does not have to defend her choices or feel responsible for the decisions of others (Sarah, letter of recommendation, 2016).

From Sarah’s individual interviews, it was gleaned that she was a second time applicant to medical school. In the previous year, she was accepted for admission at an

osteopathic medical school. She ultimately declined to enroll in the class, citing the need to pursue a gap year to “develop herself as a person and strengthen her application” (Sarah, individual interviews, 2016). Her interviewers noted her maturity and insight in both interviews. During her multiple mini interviews, standardized patients noted the positive and constructive atmosphere that Sarah created, as well as her maturity and insight into the interview scenarios.

**Mary.**

Mary is a 22-year-old African American female who was born overseas but current resides in the southeastern US. She completed a bachelor’s degree as a Biology major with Spanish minor. She graduated from a public university in the southeastern US. Academically, she graduated with a 3.5 overall GPA and an MCAT score in the 49th percentile, according to the national mean. She took the MCAT two times and scored higher on the first time taking the exam than the second time, which was three months later.

Mary is the only child in her family. Both of her parents completed bachelors degrees. She reported her father’s occupation as a religious worker, and her mother’s occupation as a homemaker. In her application, she also selected the socioeconomically disadvantaged category, due to the level of education for both parents and the income her father receives.

Mary’s personal statement attempted to connect her upbringing in a foreign country with her desire to give back to underserved communities. She recalled a trip she took to her birthplace and the level of poverty that had transformed where she had grown

up, giving her “an odd heaviness settling onto my chest” as she was observed the environment she had left (Mary, personal statement, 2016). Throughout her personal statement, Mary reflected on her faith and how it has motivated her to be grateful and serve others, beyond one’s own needs. She also highlighted the strength she felt in connecting with others, due to her multilingual background. Reflecting on her experiences growing up in a third world country, Mary summarized her motivation to dedicate her life to medicine:

...healthcare does not make me happy. Healthcare keeps me engaged, curious, and awestruck at the unfathomable complexities of the human body. It is painful, brutal, and beyond the scope of any textbook when confronted face-to-face, devastatingly beautiful. I want nothing more than to be humbled by it every day (Mary, personal statement, 2016).

Mary received letters from individuals who knew her academically, socially, and personally. Her letters of recommendation described her as someone who possessed a “welcoming demeanor and infectious smile...she epitomized happiness every day” (Mary, letter of recommendation, 2016). Her letters also addressed her academic performance, stating that “Mary may not be the applicant with the highest GPA or with the most undergraduate hours. But she will be the applicant with the strongest will to succeed” (Mary, letter of recommendation, 2016). Almost all of her letters described Mary as “mature, compassionate,” and one who “harnessed great perseverance” (Mary, letter of recommendation, 2016).

Interview comments from Mary's interview day revealed some hesitation on Mary due to her academic performance. As one interviewer stated, they felt the "biggest red flag was she said she couldn't balance honors college work while studying" (Mary, individual interview, 2016). The interviewer said her grades and decline in MCAT score gave pause about Mary's ability to succeed in the rigors of medical school. The second interviewer echoed similar sentiments. Both interviewers felt Mary was a compassionate person who could work with patients from diverse backgrounds.

In the multiple mini interviews, Mary received positive comments overall. One standardized patient commented on her compassion: "I noticed that you tried to understand where I was coming from, and this made me feel like you genuinely cared about me" (Mary, multiple mini interview, 2016). Further comments addressed her positive nature and verbal/non-verbal skills utilized during the encounter with the standardized patient. There was one comment left by a standardized patient which reflected the patient's feelings of not being heard by Mary during the encounter.

### **Document Review Analysis**

Prior to working through my research study data, I completed a general document analysis over several foundational texts. I chose to complete this step prior to framework analysis because I was seeking foundational knowledge on the medical school and the healthcare pipeline program. As outlined in chapter three, I examined electronic sources (websites for the medical school and the healthcare pipeline program). I also reviewed printed sources (healthcare pipeline program white paper, medical school and healthcare pipeline program accreditation documentation, media articles, and admissions data).

The findings I made from this document analysis allowed me to better understand the presence of the healthcare pipeline program in the context of the medical school. The healthcare pipeline program was described as the flagship experience for students who are interested in careers in healthcare. Several of the data pointed to the phrase careers in healthcare, as a way to differentiate this healthcare pipeline program from other pipeline programs which target certain professional schools (e.g. medical school pipeline programs vs. dental school pipeline programs, etc.).

The white paper (Thames, 2014) provided contextual information on the need for such a program at its inception. The statistical data on the healthcare workforce was dated to the time of the program's inception, but I observed the relevancy of the data utilized to make the case for the need of such a program. The white paper also gave me a greater understanding of the initial projections for the healthcare pipeline program, in terms of capacity and scope. Of note, the white paper did not address the need for creating an accredited healthcare pipeline program, to assist students with gaining college credit for their participation.

The media articles and the website provided greater insight into the manner by which the healthcare pipeline program is marketed to its constituents. The use of student testimonials was prominent on the healthcare pipeline program front page website. The medical school provided links to a blog written by medical students and I was able to read through past blog posts made by former students of the healthcare pipeline program. Viewing the marketing materials did not provide me with additional information on how



these materials are utilized and disseminated to prospective and current students of the healthcare pipeline program.

To set up my research study methods, I reviewed three important documents. I utilized the accreditation documents to gain greater understanding of the curriculum contents of the healthcare pipeline program. I worked with the healthcare pipeline program's leadership to compare my understanding of the curriculum components with their documentation. I utilized the accreditation documents while determining the core competencies studied throughout the healthcare pipeline program. I also reviewed the admissions data report as I gathered information on participants. The information in this report was put together with information from participants' applications. Finally, I reviewed the Core Competencies for Entering Medical Students (Association of American Medical Colleges, 2019b), in order to establish my preliminary codebook (Appendix J) and prepare myself for the first phase of framework analysis of my data.

### **Establishing Study Themes Through Framework Analysis**

To synthesize the data collected for my research study, I chose to employ framework analysis (Richie & Spencer, 1994). This form of qualitative analysis uses five steps to thematically analyze data throughout the research study. I employed this form of data analysis after I had collected all data but continued to refine my process while analyzing the data. In the following section, I outlined how I approached each step of framework analysis.

## **Familiarization**

In the first step of framework analysis, familiarization, I read through each applicant's application materials, including a) the medical school application and personal statement; b) two questions from the secondary application; c) the letters of recommendation; d) the individual interview comments, and e) the multiple mini-interview comments. In this stage of framework analysis, I was looking to familiarize myself with the data: its breadth, its depth, and general recurrent themes. I created a chart with each applicant and each piece of their application. After reading through each individual applicant's data, I ensured I took copious notes about emergent ideas and/or themes. I took notes on all data collected by individual. Additionally, I read through the data organized by the pieces of data together, to better understand themes covered in personal statements, themes covered in the letters of recommendation, etc. I found this step of familiarization helpful in my understanding of what was addressed and covered in the data.

## **Identifying a Thematic Framework**

To achieve the second stage in framework analysis, identifying a thematic framework (Ritchie & Spencer, 1994), I took my observations and notes from the familiarization phase and formulated my initial codebook (see Appendix J). The codebook was based upon some of the fifteen Core Competencies of Entering Medical Students (Association of American Medical Colleges, 2019b). During my pilot study, I selected the top three most taught core competencies to examine in the data: (1) critical thinking, (2) oral communication, and (3) resilience and adaptability. In the pilot study, I

found that using only three core competencies limited my ability to fully explore the data. There were portions of the data which could be coded to other competencies than the three competencies I selected to use.

Because of my experience within the pilot study, I decided to include more core competencies in my codebook. When examining the curriculum of the healthcare pipeline program, I observed the curriculum focused on seven competencies that had over 100 hours of instruction in the 500 hours of the program. Therefore, I elected to formulate my codebook based upon the following seven competencies: 1) capacity for improvement, 2) critical thinking, 3) cultural competence, 4) oral communication, 5) reliability and dependability, 6) resilience and adaptability, and 7) social skills. I utilized the definitions provided by the Association of American Medical Colleges (AAMC) to further define the codes for my data and create sub-codes (see Appendix G).

### **Indexing**

In the third stage of framework analysis, indexing, I coded my data. Because I dealt with five different forms of data for each of my six participants, I elected to utilize NVivo software to organize my coding system. NVivo is a computer assisted qualitative data analysis software that allows researchers to complete tasks such as transcription, coding, and analysis by housing all data sources in one platform (“What is NVivo,” 2019). I imported all data for each participant by organizing the data into various folders with tags labeled as the applicant. Then, I imported my codes and sub-codes into the “Nodes” section in NVivo. Initially, I considered examining the data by data type (reading through all personal statements, then reading through all letters of

recommendation, etc.), but I decided to read all data received for each applicant separately. In this manner, I was interested in understanding the presence of the core competencies in a complete application.

I provided my initial codebook in Appendix J. During my coding process, I created additional codes, which I categorized under the initial codes, based on the Core Competencies for Entering Medical Students (Association of American Medical Colleges, 2019b). I also created additional codes which did not fall under the seven competencies I identified initially, because they did not fit within the seven competencies, but were additional competencies. Two of the competencies I identified, service orientation and teamwork, were identified to be two competencies that are part of the fifteen core competencies identified by the Association of American Medical Colleges (2019b). Because of my initial focus on the seven competencies, I noted the coding for these additional competencies, but I elected not to analyze these competencies further. Appendix K includes my codebook with the additional codes added.

Throughout this stage of framework analysis, I conducted reflexive memoing, capturing the reasons why I elected to use some of the codes on data passages which were challenging to code. Additionally, I made notes on data which did not fall into the prescribed list of core competencies, as possible codes which may be applied to the codebook moving forward. Finally, I reached out to a research colleague at the medical school to independently code some pieces of the data. I chose this extra step during coding to ensure triangulation. I also wanted to compare our coding methods so I could

broaden my understanding of coding and uncover any potential biases I may have held at the onset of this framework analysis step.

### **Charting**

Following the indexing phase of framework analysis, I examined various visualizations in the charting phase. When thinking about the data, I put the data pieces into three different categories: 1) data submitted by the applicant, 2) data submitted at the request of the applicant, and 3) data submitted about the applicant (without their input). I endeavored to examine multiple sources of data so I could obtain an accurate snapshot of each of the six applicants. The personal statement and the secondary application were data submitted by the applicant. The letters of recommendation were data submitted at the request of the applicant. While applicants waived their right to view their letters, they had an opportunity to select who would write their letters of recommendation. Finally, the comments from the individual interviews and the multiple mini interviews (MMI) were data submitted about the applicant without their input. These comments came from the sessions the applicant completed during the interview day.

NVivo software provided several ways to examine the data. First, I wanted to determine an overall snapshot of how the seven core competencies showed up among the five data pieces for each applicant. Table 4.1 provides a chart for the presence of the seven core competencies across all data pieces for the six applicants examined in this research study.

The table shows the high frequency presence of all competencies across the letters of recommendation. Following the letters, the individual interviews provided a diverse

grouping of core competencies for all candidates. The multiple mini interviews (MMI) was the only data piece that did not contain all seven of the competencies observed. The personal statement and secondary application pieces, submitted by the participant, were spread over three to five of the core competencies.

Viewing this table allowed me to understand how each data piece may be helpful when examining core competencies and their presence in the admissions process. I also wanted to ensure that each type of data piece was reviewed thoroughly in the data analysis process. For those data pieces which were aligned with less than half of the seven core competencies, I reviewed each of them a second time, to ensure that I had thoroughly examined and coded these data against the core competencies. I also shared these data pieces with my research colleague so I could preserve triangulation using my colleague's coding of these data.

During the indexing phase, I took notes as to the occurrence of the competencies throughout the data pieces. Viewing Table 4.2 in conjunction to my notes led me to begin categorizing my observation notes and codes into broad themes. In the final section of framework analysis, I identified these observed themes.

Table 4.1

*Number of Data Materials Coded by Core Competencies*

	<b>Individual Interviews</b>	<b>Letters of Recommendation</b>	<b>Multiple Mini Interviews</b>	<b>Personal Statement</b>	<b>Secondary application</b>
Capacity for Improvement	4	6	0	2	1
Critical Thinking	6	6	4	2	2
Cultural Competence	2	5	5	5	6
Oral Communication	5	5	6	5	6
Reliability and Dependability	4	6	2	1	1
Resilience and Adaptability	6	6	3	5	5
Social Skills	5	6	6	5	6

## **Mapping and Interpretation**

The final stage of framework analysis, mapping and interpretation, encourages the researcher to utilize the graphic depictions made in the charting phase to map through four primary themes which were evident in the data. I arrived at these themes based on reflective memoing during each phase of framework analysis. As I continued to read through the data, I noted repeated occurrences of data presentations throughout each application reviewed. When I uncovered repetition across various areas in the data and among the core competencies, I began to formulate overarching themes.

From my analysis of the documents and the data pieces (personal statement, secondary application, letters of recommendation, interview comments, and MMI comments), four key themes emerged which align with the seven core competencies: 1) academic performance and excellence; 2) connecting through communication skills; 3) fostering relationships through service and leadership; and 4) personal experiences in medicine. Table 4.2 provides a snapshot of the prevalence of these themes across the data collected on all applicants.

The table revealed the presence of the communication theme across all data pieces. The service and leadership theme was strongly represented among almost all of the data pieces. The academic performance theme was strongly reflected in the letters of recommendation but not in the MMI comments collected. Finally, the personal experiences theme was strongly observed in the personal statement data piece but less so in the letters of recommendation, the individual interviews, and the MMI comments.



Table 4.2 is below. In the following sections, I have provided explanations on each theme, along with supporting data excerpts from the data I reviewed. I noted where there were similarities across the six applicants and where there were differences.

Table 4.2

*Number of Data Materials Coded by Core Competencies*

	<b>Individual Interviews</b>	<b>Letters of Recommendation</b>	<b>Multiple Mini Interviews</b>	<b>Personal Statement</b>	<b>Secondary application</b>
<b>Academic Performance and Excellence</b>	5	6	0	1	2
<b>Connecting through Communication Skills</b>	5	6	6	6	6
<b>Fostering Relationships through Service and Leadership</b>	2	6	2	6	6
<b>Personal Experiences in Medicine</b>	2	2	0	6	4

#### **Theme: Academic Performance and Excellence**

The theme of academic performance and excellence manifested itself primarily in the data that was not provided by the applicant. I elected to utilize the words performance and excellence, because I noted areas where academic metrics were discussed in the data, as well as data discussing the applicant's academic journey and characteristics for academic success. Finally, I included data which addressed a code I added to my code book on determination. This code encompassed interest in medicine as well as time

commitment, two factors I felt aligned with this theme. I aligned this code with the competency resilience and adaptability.

In the following sections, I provided brief explanations for the primary competencies of this theme. For each of the competencies, I included excerpts from the data collected on the applicants. Because many data points were able to be coded under multiple competencies, I endeavored to include unique excerpts for each competency in the theme.

### **Critical Thinking and Oral Communication**

As with the two competencies discussed in the previous section, data coded for critical thinking and oral communication overlapped in areas within the classroom, due to the nature of the experiences described. Because of this observation, I elected to present the findings of both competencies together. I also referred to Appendix K in order to code these competencies through their noted sub themes.

In the data, both competencies were displayed in the classroom (Jane, Sarah, and Mary). The critical thinking competency was found within the research laboratory (Rachel and Paul). While most of the examples come from the letters of recommendation, Rachel included the critical thinking competency within her secondary application.

Within the classroom, letter writers noted the applicant's ability to grasp information presented and take this knowledge a step further beyond what was taught. Their communication abilities were noted in the examples provided. Comments gave impressions of the applicant's academic performance and rigor. Jane's recommender commented on her critical thinking going beyond just learning and comprehending new

concepts. In addition to thinking critically, her recommender described her communication skills:

Regularly, Ms. Jane offered not only the correct answer, but more importantly the correct explanation for her answers. I found Jane always articulate, attentive and willing to learn (Jane, letter of recommendation, 2016).

In an additional letter, written by someone not associated with Jane's science courses, her critical thinking and communication skills were praised:

While I can't speak to any scientific or medically-related topics, I can unequivocally state that knows how to research, comprehend, study, discuss, expound upon, and otherwise communicate about a myriad of issues – regardless of the scope, stature, or complexity of the topics involved. She knows how to dissect a topic, understand it, contextualize the intricacies of her subject(s), and disseminate that information in a supremely usable and relevant fashion (Jane, letter of recommendation, 2016).

Sarah received praise for her academic performance. In her letter of recommendation, her recommender noted Sarah's intellectual ability to go beyond the requirements of the course to ensure mastery of the course material:

In the classroom, Sarah is one of our top students in the department. During her junior year, she took [biology courses] during her senior year, where she received one of the highest grades in the class. Sarah was very motivated in class and often stopped by my desk after lectures to discuss how the lecture material sheds new light on her understanding of current or past cellular processes/developmental

patterns or to inquire about more details on the lecture material (Sarah, letter of recommendation, 2016).

Sarah's mastery of her courses resulted in an advanced level of performance in her biology course. Her ability to clarify and relay information as needed was also recognized by her professor, who commented, "Sarah's presentation was well organized, prepared and presented at a level that would be observed at a graduate level. She has the ability to comprehend complex material as well as apply the concepts and analyze the systems and data (Sarah, letter of recommendation, 2016).

Despite Mary's difficulties in her academic performance (as noted above in the prior competency findings), her advisor and Spanish professor praised her critical thinking abilities in a supportive letter of recommendation. Her ability to communicate ideas in a foreign language impressed her professor and classmates. The following comments were provided by Mary's Spanish professor:

Indeed, Mary is a rare student who not only always completes her work with detail beyond what is asked of her but finds relevancy beyond what the class itself presents. The opinions she stated and questions she posed were worthwhile ones, at times pulling information from previous classes—even from her biology major—to what was being discussed in my classroom. She sees the connectedness of ideas and processes. Importantly, she is a deeply compassionate person who seeks to understand not only the superficial, but to go beyond to the underlying processes (Mary, letter of recommendation, 2016).

Beyond the classroom, the critical thinking competency was also noted within research efforts. In her secondary application, Rachel provided justification for her choosing to pursue a medical career with a degree in biomedical engineering. In her explanation, she established the qualities she would bring forth to the medical career from her major:

As a medical student with engineering training, I can contribute background in the design and use of biomedical technology in healthcare, familiarity with scientific literature surrounding engineered medicine, and extensive practice working in a team. Additionally, I will have an analytical mindset and will look to continually improve both my own knowledge and the practice of medicine as a whole (Rachel, secondary application, 2016).

Much like Rachel's advanced skills, one of Paul's letters of recommendation explicitly provided a description of his advanced research skills. In addition to describing the skills Paul has acquired, the recommender expressed admiration for Paul's research performance. The recommender also relayed Paul's ability to lead the team as an underclassman (sophomore in college):

He has shown the capability for performing experimental design, problem solving, and data analysis. Paul showed his eagerness for the research and has exceeded expectations, demonstrating exceptional dedication and passion for research (Paul, letter of recommendation, 2016).

## **Resilience and Adaptability and Capacity for Improvement**

I chose to categorize two competencies together: capacity for improvement and resilience and adaptability. This decision was made after I coded all data pieces collected. When examining the coding of my data, I found many overlaps in the examples provided in the applicant's medical school application and the interviews conducted. To code the data under the appropriate competency, I utilized the expanded definitions of the competencies, which I placed in Appendix B.

Four participants (Nathan, Paul, Sarah, and Mary) had individual interview comments which directly addressed this competency. Two participants (Paul and Mary) had letters of recommendation which addressed this competency. Only one participant (Nathan) addressed this competency within the personal statement.

Nathan's personal statement and comments from the individual interview addressed the capacity for improvement and resilience and adaptability competencies. He approached his academic record within his personal statement, noting the difficulties he faced and what he did to turn his grades around during college. In his comments, he referred to his ability to directly reflect on his performance and use feedback to improve his grades. He described his academic performance in his personal statement:

I had always made sports, and not school, the focus point of my life. As a result of this, my first couple years of college I received lower grades than I knew I was capable of. My grades were just not meeting my expectations. Going into my junior year of college, I placed a high amount of pressure on myself to be more successful in my classes. I knew I was capable of more and wanted to reach my

full potential. I believe I was able to accomplish this, as I received a 3.96 overall GPA for my entire third year as an undergraduate student. I learned the significance in adapting study techniques and preparation methods to my various professors and courses. (Nathan, personal statement, 2016).

In comments received on Nathan's individual interviews, the interviewers noted conversations with Nathan about his academic performance and his ability to "turn things around" with his GPA during college (Nathan, individual interviews, 2016). They also noted his awareness of his academic record and commented on his intentions to reapply if he was not successfully admitted to medical school. One interviewer noted confidence in Nathan's ability to handle the rigors of medical school, given his ability to improve his grades.

Paul's interview comments acknowledged his GPA and MCAT scores were not as competitive as others in the application cycle: "Academically he probably isn't the strongest but does have a fair amount of insight and commitment" (Paul, individual interviews, 2016). Paul's academic journey was addressed in one of his letters of recommendation. His recommender explained his capacity for improvement in a physics course:

Paul's first semester in my class was very average. He was not happy with this and after the first test of the second semester, he approached me. Many students talk to me about how they are doing their best, but Paul took this many steps further. He asked me to meet with him weekly to help clarify issues that he had. I have never had a student who put in so much effort and organization to learning

the material. Paul showed up to my office at the prescribed time each week, well organized, articulate about the concepts he was unsure on and always insistent on understanding the concept in full. He improved his performance to earn an A in the second semester of the course (Paul, letter of recommendation, 2016).

Paul received a letter of recommendation from his supervisor while he worked at a summer camp for children with disabilities. His recommender noted his growth “in his ability to be flexible when situations did not develop according to the plan he set out” (Paul, letter of recommendation, 2016). This comment was in reference to the long days Paul worked to solve problems and situations as a camp counselor.

As an applicant, Sarah shared details of her academic journey with her individual interviewers, which was an example of the capacity for improvement competency.

During her interview, Sarah’s interviewers noted her status as a reapplicant to medical school. In the prior year, she had been admitted to an osteopathic medical school, but she “didn’t feel like she was a fit so she didn’t attend. Instead she took a year off to develop herself as [a] person and strengthen her application” (Sarah, individual interview, 2016). The period in which Sarah took off and deferred entry into medical school was noted by the interviewers to have made her a mature and insightful applicant. Despite getting accepted, Sarah employed personal reflection to set goals for her personal success.

Mary’s experience with this theme took on a different perspective than prior applicants discussed. Both of her individual interviewers shared concerns over her declining academic metrics and standardized test scores. One interviewer relayed Mary’s explanation for the decline in her academic performance due to having “a hard time



balancing school and preparing for the MCAT” (Mary, individual interview, 2016). The second interviewer called her academic performance “troubling” and noted her grades “got worse every year and it wasn’t good to start with” (Mary, individual interview, 2016). Despite her poor academic performance, Mary did not address this issue in either the personal statement or in the secondary application.

Mary received a letter of recommendation from the advisor of the healthcare pipeline program. In the letter, the advisor addressed Mary’s academic difficulties and the advisor’s ability to mentor Mary in her studies. He noted her resilience, by providing the following comment:

Although she was fearful of some of our activities, she was also courageous and willing to tackle new experiences. She was always attentive and responsive to my guidance. She worked hard on getting experiences to fill gaps (Mary, letter of recommendation, 2016).

### **Social Skills**

Using the expanded definition of the social skills competency (Appendix B), I observed its presence within the letters of recommendation for three applicants (Paul, Sarah, and Jane) and Jane’s secondary application. Within this competency, I observed the use of the terms, “empathy” and “mature/maturity” to describe the applicants.

Paul’s recommenders described his eligibility for medical school as “the whole package: academic maturity, dedication to a career path that he genuinely loves as well as a deep sense of purpose. Paul’s decision to become a doctor fits well with his personality and desire to help people” (Paul, letter of recommendation, 2016). In an additional letter,

he was described as someone who “has a desire to better himself and others” (Paul, letter of recommendation, 2016). Paul showed determination not only for his academic pursuits, but through his relationships with his mentors. In a letter written by his research advisor, he was described as someone who treated his lab colleagues with respect. Despite living one hour from the lab, Paul was determined to contribute to the team by commuting several hours each week to meet with his colleagues (Paul, letter of recommendation, 2016).

In addition to excelling in her physics courses, Sarah also served as a tutor for two underclassmen sections of general physics. Her advisor praised Sarah’s ability to interact with students and solve complex problems while “maintaining a positive attitude” and demeanor (Sarah, letter of recommendation, 2016). Sarah was described as someone respected by her peers and those she tutored. In her letter of recommendation, Sarah’s physics advisor provided the following:

The students she was assisting responded well to her and her ability to explain problems. She was a good role model for the student as she stressed to them the amount of hard work and dedication course work requires (Sarah, letter of recommendation, 2016).

Jane’s recommenders described her as one whose “curiosity, fascination and empathy that she cares deeply for others” has proven her ability to be a physician (Jane, letter of recommendation, 2016). Jane’s love for connecting with others translated into her achievements within her clinical observations, as her positive demeanor and

teamwork skills were noted when working with the patients in the clinic (Jane, letter of recommendation, 2016).

Jane also discussed her motivation to connect with people in her secondary application. She explained the origins of her social skills came from early interactions with others and her love of learning. She described herself in the following way:

At nine months old I started talking and simply never stopped. At least, that's how my mother tells it. From a young age I adopted a love for language and eagerly sought out new books, information and conversations. My fascination with words fueled my interest in education from an early age and molded me into a curious student. My early eloquence gave way to an innate ease in conversation and has bore many opportunities to form friendships. In early childhood, I could be found playing dress up with my younger sisters, talking with my parent's friends or flinging myself out of trees with the neighborhood boys. This ability to find a niche in a variety of situations has served me well in adulthood, as I transitioned into the world of academia and now healthcare (Jane, secondary application, 2016).

### **Theme: Connecting Through Communication Skills**

While reading through the data and coding the various data materials, I noted several instances referring to applicants' communication skills and abilities. This theme appeared directly through almost every competency examined in this research study. Communication skills were observed in all collected data materials. As noted in the first theme I previously described, many of the competencies overlapped in the data passages,

as the examples provided addressed multiple competencies supporting communication. In this section, I described the primary competencies and provided evidence to support the presence of the competencies in the data. I also utilized the expanded definitions and sub-themes outlined in Appendix K to appropriately identify the coding of these competencies.

### **Critical Thinking**

I coded the data in this competency which looked beyond the surface of communication-related activities to make sense and bring meaning to the experiences. Rachel likened the role of the doctor-patient relationship to her experience as an actress in a theatre production. She began her personal statement describing her ability to play the role of a lead character who was not loved. For Rachel, she felt motivated to invest time trying to truly understand her character beyond the surface:

To the untrained eye, Modron seems like an awful person, incapable of redemption and undeserving of pity. She starts the play in a feud with the good witch, curses a newborn baby, and then spends the rest of the show making everyone's lives miserable. For the audience, that was where Modron ended. But, my job as an actor was to look further, to pry and to intrude in an attempt to discover why Modron behaved the way she did (Rachel, personal statement, 2016).

As she later described, Rachel used her theatre experience as motivation for her pursuits as a physician:

While I may be tempted to think I know someone based on their chart or what my coworkers tell me, I can only truly understand them by spending time and making them feel comfortable enough to tell me about themselves on their own. My practice digging deeper as an actor will help me find the truth as a physician: I know that building the doctor-patient relationship will be crucial to providing effective care for my patients (Rachel, personal statement, 2016).

As described in chapter three, the purpose of multiple mini interviews (MMI) is to give an applicant the opportunity to demonstrate their communication and empathy skills through a role play activity. These activities are then scored by the standardized patients who are also participating in the role play with the applicant. In his MMI, Nathan exhibited the critical thinking competency through his interaction with a standardized patient who commented on his performance:

I noticed that you presented a plan (working out for stress reduction) and then asked for my input and scheduled our first work out. This made me feel that you cared for me and considered my thoughts and feelings before engaging in a plan to assist me (Nathan, multiple mini interview, 2016).

### **Oral Communication**

Many of the comments provided in the individual interviews and multiple mini interviews (MMI) exhibited the oral communication competency. Many of the passages coded under this theme have been discussed in prior competency discussions under this theme and the prior theme, Academic Performance and Excellence. The main themes exhibited in the interview and MMI comments involved the ability of applicants to keep

strong eye contact with the interviewers (Nathan, Jane, and Paul) and the confidence exuded by the applicants' demeanor in the MMI (Rachel and Sarah). Mary's strong oral communication skills were noted in the comments she received during her MMI:

Mary was very warm and engaging. She used verbal and non-verbal skills to encourage and support and affirm. She was delightful; engaged and sincere in her interest and thoughts. I noticed that she tried to understand where I was coming from, and this made me feel like she genuinely cared about me (Mary, multiple mini interview, 2016).

### **Resilience and Adaptability**

Within the data, this competency focused on applicants' ability to overcome setbacks and tough situations. In one of Nathan's letters of recommendation, his experience as a mentor of high school males was described as his ability "to empathize with the guys he meets and show a great balance between caring for them and not letting it weigh him down" (Nathan, letter of recommendation, 2016). Nathan's capability to turn his grades around and improve academically was another passage coded for this competency.

Continuing with Rachel's laboratory experience described above, her application directly addressed the resilience and adaptability competency in the same experience described above. Not having advanced levels of chemistry knowledge, she quickly had to adapt to the stressful situation of working with researchers who possessed more advanced skills. Rachel proved her ability to adapt to her situation and recover from the setback of not having prior knowledge in chemistry research.

To her credit, her professor noted that in her role mentoring over fifteen undergraduate students throughout the years:

Rachel showed exemplary performance above all of the undergraduate assistants... her scientific project was very challenging not only for the undergraduates but also for my senior graduate students” (Rachel, letter of recommendation, 2016).

Jane’s performance in her MMI revealed a lack of confidence in her ability to be adaptable to the situation she engaged in during the MMI. Her reviewer provided the following written feedback towards their experience: “I noticed you were very confident but not empathetic and that made me feel that I was at fault” (Jane, MMI, 2016). This feedback indicated Jane’s inability to adapt to the situation presented to her and create a comforting environment for the standardized patient.

### **Reliability and Dependability**

The materials coded for the reliability and dependability competency referred to the applicant’s ability to work in teams and communicate with one another. There were references made to applicants’ relationships with their professors. The applicants were also recognized for their ability to follow through with academic and extracurricular activities.

Sarah’s role as a physics tutor also exhibited her reliability and dependability. As described in the prior theme, Sarah fulfilled her role as a tutor and mentor in a motivating manner which positively affected those whom she assisted:

She thrived as a physics tutor this past year. She pushed the students she tutors to do more than the assigned work and stressed to them the importance of trying the problems on their own. She emphasized to the students that there are no real shortcuts to success and that they should take pride in working hard for their success (Sarah, letter of recommendation, 2016).

Jane's letters of recommendation highlighted strengths in her character and her ability to follow through with tasks:

She is also a very reliable and dependable student. If you ask her to do something, you can rest assured that it will be done immediately. She values quality and takes personal satisfaction in doing every task to the best of her ability and with the utmost consideration for the needs of others (Jane, letter of recommendation, 2016).

Rachel worked in a science laboratory one summer and while she did not have the scientific background of her peers, her professor praised her ability to "to learn extensively about the project by reading scientific papers and educate herself," thereby owning her own academic experience (Rachel, letter of recommendation, 2016).

### **Social Skills**

Applicants were coded under the social skills competency for their ability to communicate while treating others with respect and being cognizant of their own behaviors and social cues. Despite growing up in another country, Mary used her secondary application and personal statement to describe the adaptations she made to new cultures, new people, and new surroundings. Her ability to now reflect on the needs of the



population she grew up in was due to the social skills she highlighted in her immigration to the US.

Paul's personal statement addressed his clinical experience working as an intern with the coroner's office. He reflected on his ability to adjust his own behaviors to meet the needs of others he interacted with during this experience:

I had the privilege of interacting with victims' families and counseling them through questions and concerns. I was able to practice my communication abilities and bed-side manner, valuable skills that take physicians years to perfect (Paul, personal statement, 2016).

Paul's motivation to share his experience in the coroner's office was to express his appreciation for approaching families who have lost loved ones and learn how to address the feelings and emotions of these families.

### **Cultural Competence**

Within this theme, the cultural competence competency appeared in passages related to interactions with diverse people and cultures. Most of the information in this competency was coded from the secondary application (Nathan, Jane, Rachel, and Mary). Mary also included additional information in her personal statement. For all of the applicants who displayed cultural competence, much of their dialogue discussed their cultural backgrounds.

Nathan attributed his passion of connecting with others to have originated long before high school:

Throughout my life I've been very passionate about connecting with people of diverse backgrounds. Before my high school years, I previously lived in six different cities across the country and ever since I can remember I was constantly forming and developing relationships with those of different backgrounds (Nathan, secondary application, 2016).

Jane exhibited cultural competence on a personal, cultural level. She described herself as having greater depth than just her appearance, as she referred to her family background:

When people look at me it's no doubt they recognize that my blonde hair and green eyes are indicative of my father's Irish roots. What many people fail to recognize, is that I'm also Cuban. When I reflect on my childhood I remember consuming of way too much food, muttering broken Spanish and listening to my grandmother putter around her vibrant yellow kitchen. I feel that as the granddaughter of a Cuban immigrant, I have an understanding of a culture many students are unfamiliar with (Jane, secondary application, 2016).

Rachel referred to her family dynamic as one of the ways she had set herself apart from others pursuing a medical degree. Her perspective, however, does not address racial or ethnic characteristics, but instead is observed on a socioeconomic level:

I essentially come from two different worlds: my father's, which prizes intellect and education, and my mother's, which is rural and uneducated but loving. As a result, I can relate to a wide variety of people with different occupations, levels of education, and financial statuses (Rachel, secondary application, 2016).

Mary was born outside of the United States (US). In her personal statement, she described an experience returning to her home country and observing the inequities in health and lifestyle between her third world country and the US. The dire situations she observed have been a prominent motivating factor to pursue medicine:

My fluency in the Arabic and Spanish languages have provided me with unique resources in communication, and the cultural competence needed for a prospective career in medicine. As such, I look forward to serving all, with particular emphasis on the needs of those from socioeconomically disadvantaged backgrounds (Mary, personal statement, 2016).

In her secondary application, Mary expressed her desires to use her communication skills and especially her multilingual abilities to serve patients in underserved areas:

While writing my bachelor's essay, I learned about the countless struggles that minority patients face maneuvering our healthcare system, and the disparities that exist due to shortcomings in patient education, among other factors. I intend to utilize my interpersonal, linguistic, and clinical abilities to alleviate this issue, eliminating disparities one patient at a time (Mary, secondary application, 2016).

### **Theme: Fostering Relationships Through Service and Leadership**

I chose to capture the theme of Fostering Relationships through Service and Leadership because of the many references to activities that displayed the applicant's commitment to medicine. These activities included clinical and non-clinical experiences. As mentioned in the prior two themes, some of the data coded under this theme was

through academic activities, such as mentoring or tutoring. Other activities highlighted under this theme included extracurricular sports activities. The main purpose of representing these activities in application materials was to convey the applicants' personal desires to be servant leaders.

### **Oral Communication**

I coded passages in the data which addressed the applicants' abilities to communicate through their service activities. Some applicants noted their involvement with extracurricular activities. Other applicants had comments affirming their abilities to work with constituency groups.

One of Nathan's letters of recommendation discussed his role in an extracurricular activity where he mentored young high school men. In this activity, Nathan met weekly with his group of mentees to instill purpose and encouragement to the group. He motivated his mentees to stay focused on achieving their goals. His mentor provided a glowing letter of recommendation, in which he described Nathan as having "a servant's heart" (Nathan, letter of recommendation, 2016). He further elaborated on the ease by which Nathan was able to fulfill his responsibilities as a mentor to the young men:

As a volunteer Young Life leader, Nathan invested his time initiating and building relationships with high school guys. This means going where they are and earning the right to be heard. He is persistent, teachable and has a large capacity for leadership. He does everything with excellence and really has a servant's heart (Nathan, letter of recommendation, 2016).

Jane provided a plethora of her clinical experiences in her personal statement. As a nurse technician, she navigated communication paths among her colleagues, physicians, and patients. She focused on behaviors which put patients' minds at ease while they were admitted to the hospital for their ailments. She described the communication skills she gained from her experience on the team of caregivers:

I quickly learned the importance of each member of the healthcare team, and how effective teamwork amongst them ensured each patient received an efficient visit and optimal medical care. I witnessed and tried to emulate the physicians' bedside manner. Working as a Nurse Technician gave me the opportunity to form a fellowship amongst my colleagues and find fulfillment in serving my patients (Jane, personal statement, 2016).

Rachel used her role as an actress to demonstrate her ability to dig deeper to clarify information related to her theatrical roles. She discussed the process of understanding her characters beyond their descriptions in the play script. She used her experience in the theatre to align with her intentions as a future physician:

As a theatre artist, my job is to understand how multiple characters see and interact with each other and the world they live in. As a medical student, I will come in with previous experience speaking to people both one-on-one and in large group settings in public (Rachel, secondary application, 2016).

### **Resilience and Adaptability**

Many of the passages coded under this theme addressed the applicants' adaptability in situations where their roles were challenged. For some of the applicants,

failure was the catalyst to improve their personal and service goals. Their resilience as leaders, as well as group contributors, was noted in the materials the applicants submitted, as well as those submitted on behalf of the applicant.

As previously discussed, Nathan's ability to turn his grades around and improve his GPA was the result of adapting his schedule to prioritize important tasks in his life. While he worked to improve his grades during his third year of college, he juggled mentoring high school men, working in an on-campus job, and coaching a sports team. His ability to press on, despite his demanding circumstances, resulted in his reflection on learning, as he commented, "learning in school is no longer an unrewarding experience for me, but one I can wholeheartedly enjoy" (Nathan, personal statement, 2016).

I identified two passages in Sarah's application which were related to this competency. In her personal statement, she began with a historical recounting of the first time she interacted with Eli, an ailing horse which she rehabilitated back to health. Despite the growing challenges of reteaching Eli skills and abilities to strengthen him, she persisted in her efforts. She summarized the results of her persistent behavior:

Eli came to me – or rather, the man had delivered Eli to me – in his most vulnerable state. He initially rebuffed my help, but, unbeknownst to him, he desperately needed it. With patience and perseverance, I managed to break down his walls and gain his trust and respect (Sarah, personal statement, 2016).

Sarah's persistence in a different role was noted in one of her letters of recommendation. As part of a study abroad trip to Europe, Sarah led a group on a pilgrimage to a historical site in Spain. Her professor praised Sarah for her organizational

and relational abilities with the team, overcoming challenging circumstances. I coded this passage under this competency but noted it showed a lack of mastery in this competency area. Towards the end of the letter, the professor included some constructive comments on Sarah's ability to adapt in the challenging circumstances she faced during the pilgrimage:

If I were pressed to identify an area in which Sarah can improve, it would be to not take it personally when others disagree with her or when her plans go awry due to outside circumstances. Both of these situations emerge from conditions that are beyond her control, and she does not have to defend her choices or feel responsible for the decisions of others (Sarah, letter of recommendation, 2016).

### **Social Skills**

Within this competency, I coded data which addressed applicants' abilities to interact with and reflect on the groups they served. Data originated from materials submitted by the applicant (secondary application) and data submitted on behalf of the applicant (letters of recommendation). Paul's internship with the coroner's office and the morgue opened his eyes to a challenging division of medicine and healthcare. He described his role appearing at crime scenes and capturing photographs of the recently deceased as events which encouraged him to develop his empathy and communication skills with grieving families.

In his secondary application, Paul noted the impact this activity will have on his role as a medical school student:

I will help my peers and classmates get accustomed to this occasionally perceived morbid practice of learning with the use of a deceased individual. I will also offer my experiences of speaking with people in mourning or having difficult conversations with patients and families in a clinical setting (Paul, secondary application, 2016).

As previously mentioned in prior competency explanations, Sarah spent time on a pilgrimage in Spain, leading a group of peers to various historical sites and learning about their history. As a leader in the experience, she served as a support for other students and encouraged them to persevere. Despite her personal challenges in the pilgrimage (physical sickness due to walking conditions), she consistently put the needs of others before her own:

In addition to her personal achievement, throughout the five weeks contributed to the wellbeing of the group. She helped monitor the physical condition of the other students who were walking. And on more than one occasion, her thoughtful words helped defuse tensions between other students (Sarah, letter of recommendation, 2016).

Mary held a dual role in the healthcare pipeline program. She was enrolled as a student who benefitted from the activities planned for her group and the clinical experiences she completed. However, she also served as an unofficial leader to the students living in the on-campus housing. The program advisor described her unofficial leadership position and the role she played among the leadership of the program:



Mary was recognized by the interns for her selflessness in helping them with tasks voluntarily and unexpectedly and her ease in developing new relationships. With her charming humor and radiant smile, she spurs a great sense of camaraderie among her peers (Mary, letter of recommendation, 2016).

### **Cultural Competence**

Within the prior examples of cultural competence, many of the applicants provided experiences serving other cultures and diverse groups. Jane reflected on her role as a nurse technician and the impact her patients had on her outlook of others' needs. She also reflected on her exposure to the healthcare team and how each member works collaboratively with one another. Rachel reflected on her family's socioeconomic status, commenting on the role her parents (who are coal miners) had on her perspective an interaction with underserved populations.

Paul's internship and work experiences provided a lens by which he engaged with individuals who possessed diverse perspectives on life and who may have been limited in their abilities. Through Sarah's clinical experiences, she encountered patients who did not sometimes share the same opinions as the physician, and she learned how the physician navigated decision processes with the patient. Finally, Mary's cultural background provided her with a firsthand opportunity to observe diverse populations. Her clinical and extracurricular opportunities motivated her to devote her medical career to serve underserved populations.

### **Theme: Personal Experiences in Medicine**

I captured data under the theme of Personal Experiences in Medicine because of the volume of activities related to applicants' introduction to medicine. These experiences were classified as either personal interactions with medicine or clinical interactions which impacted the applicant. Regarding applicants' personal interactions, these passages focused on the applicant or a close family member who experienced a medical emergency. The experience was introduced in the application as one of the first touchpoints for the applicant into the world of medicine. The clinical interactions coded under this theme referred to observations or work experience roles with physicians which motivated the applicant to pursue medicine. In both interactions, I noted the applicants' ability to reflect on the impact these experiences played in their personal lives.

#### **Oral Communication**

Rachel's personal experiences with medicine occurred through her clinical observations of physicians in various specialties. She described the clinical expertise the physician displayed with his patients. She also noted her personal feelings and emotions, as she was able to personally connect with patients through conversations during their clinical visits. In the three clinical exposures she outlined in her personal statement, Rachel summarized the reason for the patient to visit the doctor and the ailment the patient presented. She summarized the power of using words to make a personal connection with each patient, which further motivated her to pursue a career as a physician.

In her personal statement, Sarah also shared a personal connection with a patient during her clinical observations. She recalled a cancer patient refusing further treatment for his terminal illness. Rather than appealing the patient's family to encourage the patient to change his mind, Sarah reflected on the manner by which the physician interacted with the patient:

The doctor sat down next to him and talked with the man like an old friend, rather than a physician. The patient was not just another dying cancer patient. I watched as the patient's disposition changed. The doctor's ability to empathize and connect with his patient on a deeper, more personal level epitomized what it means to be a physician. His ability to establish such a bond with the patient healed the man in ways that a simple diagnosis could not. He had brought the patient peace (Sarah, personal statement, 2016).

### **Resilience and Adaptability**

Paul's personal statement revealed a very personal connection to medicine, through his brother's diagnosis with a chronic illness. Because of the severity of his brother's condition, Paul recalled the countless nights and weeks spent in the hospital, surrounded by his brother's physicians and caregivers. He described what he thought was common practice for other children his age: "I always thought spending holidays and birthdays in my brother's hospital room was common for everyone, just as it was for me" (Paul, personal statement, 2016). Paul described the strong bond he felt with his brother's physician. He treated Paul and his family with compassion and respect, despite the fact

that Paul was not the patient. These feelings motivated Paul to trust his brother's physician, even as his brother's ailment worsened.

Nathan began his personal statement with his first exposure to medicine, through a sports injury, which required surgery and rehabilitation. Nathan's skepticism as a patient was a primary catalyst for his growing desire to pursue medicine:

Before my surgery and rehabilitation, I naively thought, "why would I ever want to become a doctor? All they do is keep people from doing things!" These feelings persisted until my knee started getting better, and this is when I realized that, in reality, the opposite is true (Nathan, personal statement, 2016).

Nathan's resilience and renewed confidence in the power of medicine encouraged him change his major and enter medical school. In addition to his resilience, he was dedicated to further immerse himself in medicine, from a different position than what he had experienced before:

I had already experienced a patient's perspective of healthcare through my own experiences, but I wondered what it would be like to be the one providing healthcare to my own patients. My questions could only be answered through immersing myself in clinical experiences; so shortly after my surgery I did just that (Nathan, personal statement, 2016).

During her interview, Rachel recounted the moment she was introduced to medicine and how it made her faint at the sight of blood in the operating room. Her interviewers noted her experiences in the healthcare pipeline program changed her perspective on medicine. Her interviewer described her evolution in the following way:

She basically said she transformed from a student who was faint when seeing blood to holding a heart in her hand. She was intrigued with what medicine has to offer (Rachel, individual interview, 2016).

Rachel also commented on her transformation in medicine in her personal statement: “As I learned to resuscitate the training mannequin, I felt an overwhelming sense of purpose and belonging, and first set my sights on a career in medicine” (Rachel, personal statement, 2016).

### **Social Skills**

While not directly related to a human patient, Sarah’s work rehabilitating her horse, Eli, was an experience which impacted her desire to serve others as a physician. In her personal statement, she spoke at length to the difficulties she faced with an ailing horse who needed support and care. She explained how her experience with Eli prepared her for the rigors of caring for an ailing patient population:

But my experiences with horse training have developed in me the resolve to remain dedicated to caring for patients who face the toughest of circumstances. Just as there are plenty of horse trainers who know the technicalities of riding, there are also many doctors who are incredibly knowledgeable in their fields; but knowledge is simply not enough. I have learned, first through horses and later in life through my encounters with patients, that compassion – and a dedication to demonstrating this compassion – is an integral part of who I am already and who I want to be as a physician. I have seen first-hand how compassion, humility, and

empathy can turn a story of last resort into a story of victory over the seemingly impossible (Sarah, personal statement, 2016).

### **Cultural Competence**

Jane's exposure to diversity of cultures and socio-cultural effects on medicine came from her interactions with her Cuban grandmother. In her secondary application, she described the traditions and culture she adopted from interactions with her grandmother. Jane's experiences with her grandmother's culture, as well as her local culture, further motivated her to pursue medicine:

I realized that a lack of healthcare and the need for medical intervention are not unique to faraway countries but instead exist in our own backyards. Those precious clinic days will always remain with me, as they sparked my interest in family practice and further strengthened my desire to aid underserved communities (Jane, secondary application, 2016).

Jane's personal experiences with her grandmother's culture revealed similarities between her local community and communities abroad:

My grandmother inadvertently drove me to the discovery of a love for rural, family medicine when I pursued a medical mission trip to Central America a few years after she died. I finally was able to see firsthand what poverty really looked like, what inadequate health care was and how unbelievably fortunate I am to have grown up comfortably (Jane, secondary application, 2016).

Rachel was one of the few applicants who directly addressed the experiences she had in medicine, as a result of her involvement in the healthcare pipeline program. The

breadth and depth of her experiences in and out of the clinical setting of the hospital allowed her to reflect on her motivation to pursue medicine. She described the multi-dimensional exposure she gained through the opportunities provided to her in the healthcare pipeline program:

In the healthcare pipeline program, I spent time exploring health care from the perspectives of the patient, healthcare provider, hospital, insurance company, governmental public health agency, and community partner. The depth and breadth of my exploration in the healthcare pipeline program, combined with intensive shadowing of and discussions with doctors and other health care professionals, will allow me to work better with my fellow students and offer differing perspectives on issues (Rachel, secondary application, 2016).

Mary's trip to her childhood home in the Middle East brought on many realizations of the travails and poor conditions which existed in the health of her fellow countrymen. Her personal statement was built on her experiences with the impoverished people of her country, who lacked the knowledge and ability to navigate their personal health. She described the angst she personally felt when visiting these people during her college years and desiring to be able to help them beyond their disadvantaged conditions:

I had always been aware of the dire poverty throughout Egypt, but now it seemed much more personal. Each time I made eye contact with another impoverished individual I held it, taking in every bit of their broken, disheveled appearances and unique medical afflictions. I realize that each one of us have our distinct role to play in the world throughout the time in which we occupy it. However, the

ache in my chest brought about an impossible desire to have been born earlier so that my role in these individuals' lives could have begun long ago (Mary, personal statement, 2016).

### **Summary of Themes**

The presence of the Association of American Medical Colleges' Core Competencies for Entering Medical Students (2019b) was observed in the data through four identified themes. The expression of these competencies was noted through the applicant's reflections, the observations made by personal and professional contacts of the applicants, and through evaluation of the interviews the applicants completed at their interview day. The competencies expressed academic, social, service, and personal experiences of the applicants.

When examining the academic pursuits of participants in this research study, common themes emerged. Letters of recommendation directly addressed academic performance, including course grades and position in the overall ranking order of the course's participants. Applicants utilized the personal statement and secondary application to express their academic hardships and the process they endured to overcome academic difficulties.

Evaluations of poor academic performance were highlighted primarily in the individual interview comments. In these sections, interviewers provided additional information, based on the applicant's answers during the interview. Two applicants were noted to have poor academic performance. One applicant elected to address his academic shortcomings in his personal statement. His passage affirmed his ability and capability to



improve. The other applicant whose academic abilities were weak did not address her shortcomings in neither her personal statement nor in the secondary application. The capacity for improvement competency was highly evident in this theme.

Among the four themes noted in this research study, *communication skills* was the most frequent. Communication skills noted in this theme included spoken word and listening abilities. Applicants utilized their personal statements to reflect on their ability to communicate effectively with underserved, uninformed communities that desired greater knowledge of healthcare and wellness. Interviews and multiple mini interviews evaluated the applicants' ability to communicate and share information effectively through the structured interaction. None of the applicants were noted to have lacked in communication skills; rather, the diversity of communication styles was evident among the data provided on the applicants.

The third theme regarding relationships through service and leadership addressed the notion of the applicant's commitment to medicine. Data which addressed this theme directly identified applicants' leadership abilities and expressions. The data also addressed applicants' capacity to juggle many service, leadership, and academic obligations simultaneously. Competencies coded within this theme addressed servant leadership and various personal and professional experiences. While all applicants received praised for their leadership and service skills, one applicant was noted to sometimes fall short of fostering relationships, due to overwhelming stress or unexpected outcomes in a situation.

The final theme of personal experiences in medicine was based on a significant portion of the data dedicated to applicants' personal exposure to medicine. To further display their desires to become physicians, some applicants provided insight into their direct clinical experiences and observations. Other applicants spoke candidly about ailments, accidents, and illness. These experiences personalized the field of medicine for them and motivated them to pursue a career as a physician. The data observed in this theme informed the experiences observed in the first three themes.

### **Chapter Summary**

I began this chapter by restating my research question and reviewing my methodological approach to complete a descriptive qualitative study. I introduced my study participants through their quantitative descriptive data, represented in a table at the beginning of the chapter. I also provided a comprehensive narrative describing each participant, through the data provided in various sections of their medical school applications. I outlined my approach to completing the data analysis through framework analysis. Then, I outlined and provided findings on my four themes identified in this research study: 1) academic performance and excellence, 2) connecting through communication skills, 3) fostering relationships through service and leadership, and 4) personal experiences in medicine. I provided results and quotations supporting each theme. I then provided a summary of the themes discussed in this research study.

In chapter five, I summarize the study and its findings. I also connect these findings to the literature that was reviewed in chapter two. I note the limitations I

recognized in this research study. Then, I end the chapter with a discussion on the implications for future research and practice.

## **CHAPTER FIVE**

### **DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS**

#### **Introduction**

This research study examined the medical school admissions process and specifically how the Core Competencies of Entering Medical Students (Association of American Medical Colleges, 2019b) were presented in the applications of students who completed a healthcare pipeline program. Six participants were selected for this descriptive qualitative study. This research study's data originated from the medical school admissions application process. Data pieces included narratives submitted by the applicant (personal statement and secondary application), narrative submitted on behalf of the applicant (letters of recommendation), and comments provided about the applicant (individual interviews and multiple mini interviews). The research question pursued in this study was the following:

- How are the Association of American Medical Colleges (AAMC)'s Core Competencies for Entering Medical Students displayed in the medical school application process of students who completed a healthcare pipeline program?

A coding framework (Appendix K) was developed and used during the analysis of data pieces. The codebook was created, based on the conceptual framework. The codebook was revised during the research study data analysis process and a final version of the codebook was used to identify prominent themes in the data and reflect the presence of core competencies in the data. This chapter summarizes and discusses this

research study in the following sections: 1) study findings, 2) study limitations, 3) implications for practice, and 4) implications for future research.

### **Study Findings**

Table 4.1 visually captures the contents of the data materials against the core competencies studied in this research study. Because the data materials were the sole source of data in this research study, I felt it was important to discuss the findings according to the data materials. In the following section, I examined the findings related to the conceptual frameworks I utilized to build my study. Then, I examined the core competencies which were found in each data piece. Finally, I examined the findings related to the four themes I identified during my data analysis.

#### **Findings Related to the Conceptual Framework**

I utilized two conceptual frameworks to build this research study: 1) Sternberg's Theory of Triarchic Intelligence (1984) and 2) the Association of American Medical Colleges' Experiences-Attributes-Metrics Model (2013). Sternberg's (2007) theory addressed the variation in levels of intelligence and the ability to measure intelligence in more ways than just through traditional graded assessments and instruction. Among the analytical, creative, and creative abilities Sternberg (2007) defined, he stressed the importance of knowledge being used to connect them together.

Sternberg (2007) argued for individuals to use these abilities in a symbiotic manner, balancing their expression of knowledge through either analytical means, within creative boundaries, or among practical, streets-smarts situations. Finally, Sternberg's (1984) theory stressed that intelligence must be readily measured in many ways, in order

to accommodate to the diversity of how people learn and function in processes such as an admissions process.

In this research study, I was interested in finding the manner by which competencies were identified and displayed in the medical school application process. According to the definition of intelligence defined by Sternberg (1984), I was able to examine applicants' successful intelligence in three ways: (1) using the skillset of abilities and individual possesses based on the sociocultural environment, (2) awareness of strengths and weaknesses and how to adjust life choices on these strengths and weaknesses, (3) adaptations to environments through balancing the analytical, creative, and practical abilities. The data provided in the applications of the six applicants revealed the three ways listed above.

Applicants exhibited their skillset as they described the nature of the environment they experienced personal and clinical experiences. They also reflected on moments of strength within their service and leadership activities, as well as noted times where they failed to complete challenges presented to them. The materials provided on behalf of the applicants and about the applicants balanced the adaptations the applicants made towards their academic performance, their ability to connect with interviewers, and their roles solving problems within their extracurricular activities.

In addition to Sternberg (2007), the Association of American Medical Colleges (AAMC) created the Experiences-Attributes-Metrics Model (2013). This model was developed as the AAMC began to encourage medical schools to adopt a holistic model of admissions (Witzburg & Sondheimer, 2013). Holistic admissions focused on going

beyond the academic and statistical measures of admissions to examine applicants' qualities and characteristics which define them (Conrad et al., 2016).

This model, characterized by three concentric circles, placed metrics (grades, grade point averages, and standardized test scores) in the center circle. The second circle, which embedded the metrics, identified attributes that define the applicant, including who they are and the backgrounds they represent. The final circle, which surrounded the first two circles, concerned the experiences that applicants have had, which have defined and shaped their identities. The AAMC argued for the examination of applicants according to the three circles simultaneously, rather than one circle over another. This model was based on prior literature from the business industry, which argued for the examination of employees for their characteristics and unique qualities (Loden & Rosener, 1990).

This conceptual framework guided the review of data and data analysis in this research study. The findings included academic metrics and performance, identified through data that was provided on behalf of the applicant. Data included the academic accolades, as well as academics which reflected a lack of improvement or excellence. In addition, applicants included information in their applications which were focused on their values, beliefs, and leadership skills. Applicants' service work was defined in materials provided by the applicant and on behalf of the applicant. Finally, applications implemented the competencies through various experiences, based on community service activities, life experiences, and cultural events.

## **Findings Related to Data Pieces**

### **Individual Interviews.**

Individual interviews contained strong presence of almost all competencies in this research study. All applicants revealed critical thinking and resilience and adaptability competencies. The remaining competencies, social skills, oral communication, capacity for improvement, and reliability and dependability, were present among almost all applicants as well. The final competency, cultural competence, was present in less than half of the applicant's individual interviews.

These findings related to the individual interview fall in line with the content and structure of the individuals interviews at the medical school. Between the two interviews, the first individual interview focused on the applicant's application and motivations to attend medical school. The second interview allowed the applicant to use their critical thinking skills to respond to ethical and moral medical scenarios. Therefore, the presence of the competencies listed above supports the structure of the individual interviews in the application process. The lack of the cultural competence competency may be justified by the applicant's diverse experiences and their willingness to share these experiences within the interview.

The comments from the individual interviews seemed to overwhelmingly focus on the academic and statistical data on each applicant. The results of my research study supported the strength of the interview as one of the most important aspects of admissions (Monroe et al., 2013; Eva, Rosenfeld, Reiter, & Norman, 2004). However, the individual interview comments in this research study did not necessarily support the



literature that the interview was the most important factor (Johnson & Edwards, 1991). The letters of recommendation and personal statement contained a greater presence of competencies than the letters of recommendation.

The results of my research study did, however, support a prior study which found applicants from disadvantaged backgrounds had positive interview experiences because of their ability to speak about their hardships (Henderson et al., 2018). With Mary's application, the interview comments supported this notion of her ability to discuss her academic hardships, despite a declining academic performance in her classes and on the MCAT.

### **Letters of Recommendation.**

Among the five data pieces, the letters of recommendation contained the highest amount of all seven competencies. The six applicants received letters of recommendation which contained the five core competencies: 1) capacity for improvement, 2) critical thinking, 3) reliability and dependability, 4) resilience and adaptability, and 5) social skills. Five applicants' letters included the remaining two core competencies cultural competence and oral communication.

The presence of all competencies in the letters of recommendation supports the literature on the importance of this data material as a component of medical school admissions (Kuncel, Kochevar, & Ones, 2014). The letters provided a comprehensive snapshot of the applicant, given the information provided on the applicants' personal, professional, and academic characteristics. The presence of all competencies across the letter of recommendation refutes the findings from DeZee et al. (2014) that letters of

recommendation fail to represent a complete picture of applicants' strengths and weaknesses.

### **Multiple Mini Interviews (MMI).**

The multiple mini interviews (MMI) had the most variability among the presence of the competencies. The social skills and oral communication competencies were present among all MMIs of the applicants. Four competencies, cultural competence, critical thinking, resilience and adaptability, and reliability and dependability, were also present in the MMIs but for less than all applicants. The final competency, capacity for improvement, was not present in any of the MMIs.

The lack of a presence of capacity of improvement makes sense in this research study. The nature of the MMIs administered at the medical school interview day is such that, applicants were provided with scenarios they read prior to engaging in the MMI. With only a given amount of time to engage in the role play scenario, this competency would not have been measured, since it is a competency which indicates improvement over time.

Prior research supported the results of this study and the presence of critical thinking and communication-related competencies in MMI (Kirch, Gusic, & Ast, 2015; Pau, Jeevaratnam, Chen, Fall, Khoo, & Nadarajah, 2013). My research study findings related to MMI aligned with Kumar et al. (2009)'s findings that using MMIs solely for admissions decisions may be limited. When reading through the MMI comments, I found I was limited in my understanding of the applicant, given the brief comments that were focused solely on the scenario the applicant completed.

### **Personal Statement.**

In addition to the letters of recommendation, the personal statement also contained almost half of the competencies present. Almost all applicants had the cultural competence, oral communication, resilience and adaptability, and social skills competencies present in their personal statement. The competencies capacity for improvement, critical thinking, and reliability and dependability were less present in the personal statements.

This data piece, written by the applicant, contained several elements which were not found in any other piece of data. Because of its very personalized nature, some of the stories, references, and reasons for pursuing medical school were unique to the applicant. Personal statements were utilized to connect the reader to the applicant, through notable experiences, interactions, or events which shaped the applicant's interest in medicine. The personal statements also served to justify how the applicant's journey to medical school has shown their resilience and motivation to pursue a career in medicine, despite personal or academic hardships.

The contents of the personal statements supported prior literature on the intent of the personal statement to situate the applicant as a medical professional through their applicable experiences (Association of American Medical Colleges, 2019i; Ding, 2007; Bekins, Huckin, & Kijak, 2004). While the presence of competencies was supported through the personal statement, my research study did not address the role of personal statements in the predictive validity of success in medical school (Murphy, Klieger,

Borneman, & Kuncel, 2009). A further research study would need to be constructed to understand how success is measured in medical school.

### **Secondary Application.**

The secondary application contained presence of all competencies examined in this research study. Three competencies were found among all applicants: 1) cultural competence, 2) oral communication, and 3) social skills. Two competencies, resilience and adaptability and critical thinking were present as well. The final two competencies, capacity for improvement and reliability and dependability were only present in one applicant.

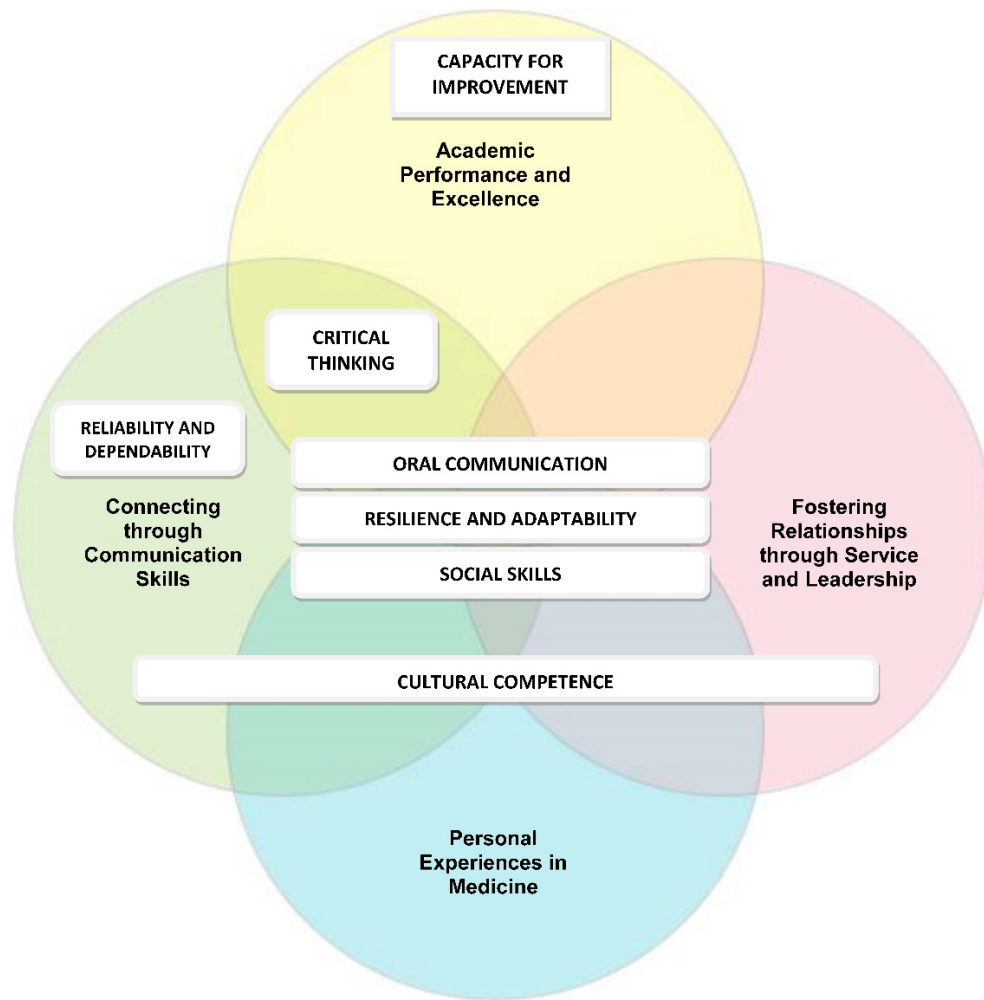
The secondary application was designed by the medical school to obtain more details from the applicant as to their qualifications and motivations to attend medical school. Of the questions I coded, the applicants provided further details related to their experiences in medicine, their motivations to seek a career as a physician, and the ways they were able to overcome hardships in their lives. Because the nature of secondary applications is personalized to the university, there was not literature to support its efficacy in the admissions process. However, after analyzing this portion of the medical school application, the data supported the evolution of holistic admissions as a manner by which applicants may be reviewed (Kirch, Gusic, & Ast, 2015; Scott & Zerwic, 2015).

### **Findings Related to Themes**

The purpose of this research study was to examine the presence of core competencies in the medical school admissions process for students who have completed a healthcare pipeline program. In addition to examining the study results by the data

materials studied, I created Table 4.2 to understand the presence of the seven core competencies against four main themes addressed in the data. In the following section, I examined each theme which provided greater organization of the data coded for the competencies.

To better understand the presence of the core competencies within these themes, I created a figure to visually represent the themes and the core competencies addressed in the themes (see Figure 5.1). Three competencies were represented in all four themes: *oral communication, resilience and adaptability*, and *social skills*. The competency *cultural competence* was present across three of the four themes. The competency *critical thinking* was represented in two themes. The final two competencies, *reliability and dependability* and *capacity for improvement* were represented in one theme each. In the following section, I provided explanation over these findings, as well as linked the findings back to the literature discussed in chapter two.



*Figure 5.1.* Core Competencies' presence among four themes existent in the data.

Central to all four themes of this research study were three competencies: oral communication, resilience and adaptability, and social skills. These competencies manifested themselves in all data pieces collected. This finding supported much of the literature on competencies in medical education, from medical school to residency (Englander et al., 2016; Accreditation Council for Graduate Medical Education, 2012; Kennedy et al., 2007). The presence of oral communication as a prominent competency

across all four themes was supported through Epstein and Hundert (2002)'s definition of competency to include communication. While these competencies were included in findings presented by Albanese et al. (2003), their presence within all themes indicated their importance in the medical school admissions process. Despite being three different competencies, their presence was noted across several of the same examples in the data, as noted in the findings in Chapter Four.

### **Academic Performance and Excellence.**

I created the *academic performance and excellence* theme because of the presence of data addressing academic hardships and successes within the data. Data which were categorized in this theme were found in the comments primarily provided on behalf of the applicant (letters of recommendation). This finding was interesting for the applicants whose grades or standardized test scores were not above the national mean.

I would have expected to find more information and justification on academic improvement or perseverance among the personal statement or secondary application of applicants who did not have strong grades or scores. However, I found justifications of academic performance only in participants' letters of recommendation or within the comments from the individual interviews. Of note, almost all of the individual interviews revealed information on academic performance of applicants, whether it was the interviewer's personal reflection the academic performance of the applicant, or the comments provided by the applicant during the interview.

When thinking through the primary themes of this research study, I identified the *academic performance and excellence* theme based on the conceptual framework of the

Experiences-Attributes-Metrics Model (Association of American Medical Colleges, 2013). At the heart of the model is an applicant's academic metrics—MCAT scores, grades, and grade point average. This model represented a shift away from traditional statistical admissions review (Raman et al., 2019; Gay et al., 2018; Sesate et al., 2017).

Representing holistic admissions, this model incorporated academic metrics along with applicant's attributes and experiences. I included these three model layers into the academic performance and excellence theme, in that I did not only focus on whether an applicant showed academic excellence. Data which fell under this theme also addressed applicants whose struggles with academics were noted and either discussed by the applicant or by the interviewer.

This theme included several instances of the *critical thinking* competency, which was shared with another theme (connecting through communication skills). The data represented the applicant's ability to use logic and reasoning in making decisions, as well as weighing the strengths and weaknesses of their options related to their academic success. Much of the decisions noted in the data under this theme revolved around the applicant's ability to think critically about their curriculums and utilizing resources to succeed academically (Cleland et al., 2012).

The competency *capacity for improvement* only appeared in this theme. The presence of this competency within the academic performance and excellence theme supported the literature focused on applicants' ability to succeed and recover from setbacks (Tempski et al., 2015). Applicants reflected on poor academic performance during their early years of college and their ability to change study habits to improve



academically. They also reflected on their ability to improve themselves and their academic skills, through enrollment in summer courses and pre-medical preparation programs, such as the healthcare pipeline program. Finally, applicants were described in the manner by which they were able to master the knowledge of their courses and their ability to go beyond the class requirements to prove their mastery of the course objectives through research endeavors.

### **Connecting through Communication Skills.**

The theme connecting through communication skills was dominant across all data materials in this research study. This theme encompassed the competencies addressing communication skills, as well as how communication allowed applicants to overcome hardships, interact with diverse individuals, and work through any academic challenges. I was not surprised to find this theme contained six of the seven competencies, due to its broad focus.

Of the four themes addressed in this research study, this theme is the most comprehensive, due to its inclusivity of almost all of the competencies. In my understanding of the competencies prior to coding the data, I anticipated communication as a vehicle for many of the competencies, because of its versatility across the experiences and attributes that applicants displayed in the application process. The literature on competencies also pointed to the presence of communication across competencies along the medical school continuum (Englander et al., 2013; Epstein & Hundert, 2002). The presence of competencies leading into medical school also

supported literature which encouraged the creation of competency based medical education (Frank, Snell, Englander, & Holmboe, 2017; Carraccio et al., 2016).

Within the medical school application process, communication skills manifested themselves through experiences dealing with peers, professors, and patients. Applicants noted how oral and written communication skills were vital to making connections with others. Despite the fact that written communication was not included in this research study, I noted the presence of written communication skills as part of the coding process of the data. Future research studies may incorporate written communication as one of the competencies to examine in medical school applications.

Another characteristic I found within the data coded under this theme was the applicant's ability to highlight their personal roles and position with the experiences they included. The applicants, along with those who submitted letters of recommendation and the interviewers, provided descriptions of activities which showed applicants' abilities to communicate effectively, listen to feedback, and take ownership over their actions in courses, extracurricular activities, or research obligations. This theme, therefore, greatly supported the experiences layer of the Experiences-Attributes-Metrics Model, which highlighted the cultural, historical, and geographical events which defined an applicant's candidacy (Association of American Medical Colleges, 2013).

### **Fostering Relationships through Service and Leadership.**

As noted in the figure above, the theme of fostering relationships through service and leadership was identified through four competencies examined in this research study: (1) oral communication, (2) resilience and adaptability, (3) social skills, and (4) cultural

competence. The last competency, cultural competence, was also observed across two additional themes (connecting through communication skills and personal experiences in medicine). Although service and leadership were highlighted across the letters of recommendation, the personal statement, and secondary application, they were not as present in the individual interviews or the MMI.

This theme focused on the applicant's ability to work in teams and devote time to serving others. Experiences reflected the applicant's involvement in extracurricular activities, such as sports teams, university-level social groups, mentorships and internships, and teaching assistantships. The primary themes of the experiences highlighted in this theme were the applicant's ability to use their communication skills to communicate with others, recognize and celebrate diversity dimensions among groups of people, and adjust behaviors to meet the needs of various groups, in order to respect others.

While not studied in this research study, I noted the presence of two additional competencies which make up the fifteen core competencies for entering medical students (Association of American Medical Colleges, 2019b). These competencies, service orientation and teamwork were not identified for the purposes of this research study. However, I found that if they were, they would have fallen within this theme of fostering relationships in service and leadership. I noted the presence of these competencies during the familiarization phase of framework analysis. I noted these competencies in the revised codebook (Appendix K).

The literature indirectly addressed this theme, as researchers noted the bias that may exist in the authorship of letters of recommendation which may describe these service and leadership experiences (Kuncel, Kochevar, & Ones, 2014). Although this research study did not address Madera, Hebl, and Martin's (2009) finding regarding differences between letters written for males and females, a future study is needed to examine whether data classified under this theme addressed differences across gender.

The presence of service and leadership as a way of engaging in relationships among people was supported in the literature regarding people of diverse backgrounds (Scott & Zerwic, 2015). In addition to referencing their personal journeys interacting with diverse individuals, applicants established narratives which described their interactions with diverse people. These narratives were provided in the written materials, but not in the interview comments. I attributed this factor to Bibler Zaidi et al. (2016), who argued the time constraints in the interview process hindered the applicant's ability to delve deeply into fostering relationships related to service or leadership. Finally, applicants' ability to place themselves as servant leaders within the medical community further supported the literature describing applicants' abilities to position themselves within the field of medicine (Bekins, Huckin, & Kijak, 2004).

### **Personal Experiences in Medicine.**

As explained in the prior section on personal statement and secondary application, the theme of personal experiences in medicine appeared primarily in the data materials that were submitted by the applicant. Data coded in this category addressed personal or

clinical experiences which motivated the applicant to pursue a career as a physician. I was not surprised to see data classified under this theme.

When conducting preliminary research for this study, I consulted with several sources as if I was an applicant to medical school. I was interested in seeing how an applicant would experience the application process. In several sources, I noted the recommendation of considering personal experiences and touchpoints in medicine while putting together the application for medical school (Association of American Medical Colleges, 2019b; Association of American Medical Colleges, 2019c; Association of American Medical Colleges, 2019e; Association of American Medical Colleges, 2019i; Albanese et al., 2003).

Data coded in this theme related to moments of personal exposure to medicine. For example, a sickness or injury in childhood resulted in the applicant working with a physician to heal their symptoms and rehabilitate their bodies back to health. These experiences made an impression on the applicant, to the point that the applicant's lack of trust in medicine evolved into a fascination of healthcare and how the physician improved the applicant's well-being.

Data also reflected moments where the applicant was able to gain access to the clinical environment, through clinical observations and medical internships (Bouye, McCleary, & Williams, 2016; Freeman et al., 2015; Newton, Billett, Jolly, & Ockerby, 2009). The clinical observation experiences provided the applicants with the ability to observe physicians' behaviors, demeanor, and desire to create a positive environment for physician-patient interactions. This research study reinforced the literature findings of a

positive correlation between clinical experiences and applicants' interests in pursuing careers in medicine (Bouye, McCleary, & Williams, 2016).

The theme of personal experiences in medicine confirmed the research conducted by Witzburg and Sondheimer (2013), which emphasized the need to consider an applicant's life experiences and ability to travel along a life journey towards a career in medicine. This theme personalized the medical experiences for applicants and empowered them to reflect upon their individualized exposure to medicine (Monroe et al., 2013; Barton, Ariail, & Smith, 2004). The competencies coded in this theme reflected the ability for applicants to interact with others, despite their unique backgrounds or situations.

While the theme of *personal experiences in medicine* does not directly address academic metrics, I found this theme to be important in understanding medical school admissions. For some applicants, personal experiences are the gateway to understanding medicine from the perspective of a patient (Weiss & Swede, 2019; Manary et al., 2013). For other applicants, witnessing and observing physician-patient relationships further confirmed their desire to pursue a medical career. The results of my research study reinforced the need for initiatives such as pipeline programs to introduce students to medicine with personalized interactions and experiences (Freeman et al., 2015).

### **Study Limitations**

I noted some limitations in this research study. Because I used data which was originally collected for the purpose of medical school admission, I was limited by the types and composition of the data. By not interacting with my participants, I was limited

to the voices of my participants that could be inferred from their application materials. Additionally, I did not interact with their letter writers or interviewers. Therefore, my data analysis was limited to my interpretation of the data and the examples provided in various data pieces.

A limitation of my research study came from the year I chose to pull data from the admissions cycle of the medical school. Despite the fact that 2016 was the first year multiple mini interviews (MMI) were introduced as an interview day component, the standardized patients were not required to provide comments from their interviews with applicants. Therefore, from the onset of the participant selection, I had to eliminate a portion of students who could be eligible for this study because they did not have written comments from their MMIs. Since 2016, however, the comments rubric has been refined and now all applicants receive comments. There is also a required question that all standardized patients answer, following their interaction with the applicant. Future studies, therefore, may have richer data provided from the MMIs, because of this correction and refinement.

Another limitation of this research study was in the manner by which participants were selected. The six participants were chosen using statistics representative of the state in which the healthcare pipeline program took place. The admissions office chose six participants for me from the population criteria I shared with them. Because I eliminated participants on the basis of their MMI comments, I was limited by who I could choose, according to race and gender criteria.

A final limitation noted in this research study is the lack of in-depth knowledge concerning participants' personal backgrounds. While this research study focused on students who completed the final level of the healthcare pipeline program, it did not account for whether these participants completed any other coaching, mentoring or other pipeline programs which may have prepared them for medical school admissions. Therefore, it would be important for a future study to investigate more into the lives of the participants to determine whether other preparation materials or experiences were utilized in medical school application preparation.

### **Implications for Practice**

As mentioned in the prior section on my positionality, I was very interested in pursuing this research study, given my role in multiple levels of medical education. At all points throughout this study, I routinely asked myself “so what?” to stay focused on the research purpose. The results of this study reinforced a holistic admission process and the importance of examining multiple areas of a medical school application in order to assess eligibility for admissions. In thinking through implications for practice, I viewed the results of this research study through the lens of pipeline programs, medical schools, and potential applicants.

### **Pipeline Programs**

Pipeline programs intend to provide students with academic and clinical experiences to prepare them for a career in healthcare. Prior research on pipeline programs has addressed the need for opportunities to experience healthcare among students from various racial and ethnic backgrounds (Bouye, McClearly, & Williams,



2016; Smith et al., 2009; Little et al., 1999), socioeconomic levels (Kumar, Jones, Naden, & Roberts, 2015; Dalley et al., 2009), and intended career opportunities (Freeman et al., 2015; Wang et al., 2015). These programs, which may be sponsored by health systems or universities, do not frequently publish their in-depth curricula online. Despite the literature I reviewed on pipeline programs, I failed to find sufficient literature on any pipeline program which was structured around the Association of American Medical Colleges (AAMC)'s core competencies (Association of American Medical Colleges, 2019b).

Due to my intimate role with the healthcare pipeline program I focused on for this study, I noted the need for further enhancements that may be made to the program's objectives and curriculum. The results of my research study will provide pipeline programs with a roadmap to better incorporate competency education within their curriculum. Additionally, understanding how competencies are displayed in the application process will allow pipeline programs to better equip their students with the resources necessary to be successful.

### **Medical Schools**

As the literature in chapter two addressed, medical schools are becoming more and more competitive in their admissions processes (Kreiter & Axelson, 2013; Albanese, Snow, Skochelak, Huggett, & Farrell, 2003). Students are continually seeking opportunities to better understand the admissions process and how they can be successful. In addition to the experiences provided by pipeline programs, students are presented with

tools and resources from medical schools and even national associations to better prepare them for admissions (Freeman et al., 2015; Schultz et al., 2011; Strayhorn, 2011).

The results of this research study are helpful to medical schools for a variety of reasons. First, the medical school admissions office can better understand the purpose and use of the competencies identified by the Association of American Medical Colleges (AAMC) (2019b). Understanding how each piece of data may contain useful information focused on competencies will allow admissions committees to devote sufficient time to proper applicant discussion and review.

Additionally, medical schools may decide to weigh the various pieces of data according to what determines a successful applicant to medical schools. If committees have previously given more weight to the individual interview, they may review this study and understand the role of letters of recommendation and the personal statement in revealing mastery of the core competencies. Therefore, the role of these two pieces of data may be looked at more closely or held with greater weight than the other categories.

Finally, the results of my research study will assist medical schools with better training for their committee members. In medical schools who have diverse admissions committees, it will be important to explain the role of competencies in medical education. As the literature revealed in chapter two, competencies which exist for entering medical students continue to remain as competencies through residency and beyond (Carraccio et al., 2017; Malik et al., 2012). Better education and training on identifying these competencies will empower admissions committee members to recognize high achieving and promising applicants to medical school.

## **Potential Applicants**

Students entering the medical school admissions process may greatly benefit from this research study and its findings. As students continue to find ways to diversify themselves, they can also learn what aspects of their lives should be included in their applications for admissions. Students can use the themes identified in this research study to frame their approach to their applications. Among the four themes, students will understand how best to represent the themes throughout the data pieces they submit, and those pieces submitted on their behalf.

Additionally, students can use results from this study to inform them on how best to approach the interview processes. Having an idea of what was generally addressed in the interviews will give students an opportunity to better prepare themselves prior to their interview day. Finally, the prominence of letters of recommendation should provide students with greater insight into choosing the right person to submit a letter of recommendation in support of their application to medical school.

## **Implications for Future Research**

While there has been prior literature concerning competencies at the undergraduate and graduate levels of medical education (Association of American Medical Colleges, 2018b; Carraccio et al., 2017; ten Cate, 2017; Malik et al., 2012), there has been little research on the competencies exhibited by students applying to enter undergraduate medical education. As a result, the findings from my study emphasize the need to educate students not only on the core competencies sought out for medical school, but also on the ability of students to articulate these competencies in their

application materials. While this research study focused primarily on specific competencies identified in the curriculum of the healthcare pipeline program, I believe there needs to be extensive further research on a greater number of the competencies for entering medical students. While this study only focused on seven of the fifteen core competencies, future research may encompass the entirety of the competencies among medical school applications.

Additionally, this study was focused on a small sample of students who participated in the healthcare pipeline program. Further research studies may be conducted which would compare students from the healthcare pipeline program with students who did not complete the healthcare pipeline program. To carry out further research like a suggested comparative study, the researcher may want to design a study which uses application materials, as well as live questionnaires or interviews with the applicants.

This research study did not focus specifically on the time of year in which student applicants apply to medical school. The nature of the early decision period is that students are solely focused on attending the school to which they are applying. Applicants also must submit their applications earlier to be considered for early decision (Association of American Medical Colleges, 2019e). Because of the condensed nature of time in which applications must be submitted for medical school, further research needs to focus on understanding if certain competencies take precedence over others between early and regular decision timeframes of the application consideration cycles.

Various demographics were provided on the applicants in Table 3.5. These characteristics included age, race, gender, academic major and type of institution attended. While this research study focused primarily on criteria reflecting race and gender, future research studies focused on academic major or institution type would be worthwhile. These characteristics may shape the applicant's academic background or ability to obtain certain resources to prepare for medical school. A greater study into the type of institution attended could shed light on what types of resources and support exist at smaller institutions as well as larger institutions.

The medical school application shed light on some details of the applicant's family background and influence. Information on number of siblings and their ages, as well as parents' education levels and their current work industry, provided a snapshot of the familial influences on the applicant. Further information may have been provided by the applicant in their personal statement or secondary application, if they chose to do so.

Further studies which focus on family backgrounds and their influences on pursuing a career in medicine would be beneficial for medical schools to understand whether there is a need for resources to support students with different family backgrounds. Additionally, there is a need for future research focused on varying socioeconomic levels and whether these factors play a role in medical school admissions and what resources and access levels may be available.

In addition to family background and socioeconomic levels, future research on this topic can focus on language ability as a factor in the medical school admissions process. Many of the competencies focused on interpersonal and intrapersonal

competencies fall under the theme of communication skills. Understanding applicants through the lens of their language abilities may provide future recommendations for the application process and the review of applicants whose language origins may be unique. Some of these nontraditional language abilities may include applicants whose first language is something other than English or applicants who speak multiple languages.

Finally, this research study was established as a descriptive qualitative study which focused on the application process of students applying to medical school. There were several pieces of data used in this research study. Further research studies may isolate parts of the applications and study each data piece separately. For example, prior research studies focused primarily on individual interviews or MMIs (Jerant et al., 2019; Bibler Zaidi et al., 2016; Kirch, Gusic, & Ast, 2015; Dunleavy & Whitaker, 2011; Eva et al., 2004; Patrick et al., 2001). Future research studies can isolate the secondary application or the personal statement only to discover emergent themes in the competencies and these data pieces.

### **Chapter Summary**

This chapter began with the purpose as well as a brief overview of this research study. I provided a summary of the results which were classified among four themes: (1) academic performance and excellence, (2) connecting through communication skills, (3) fostering relationships through service and leadership, and (4) personal experiences in medicine. I also discussed how the findings aligned with the literature captured in Chapter Two and the conceptual framework used to build this study. Finally, I offered

reflections on implication for practice in medical school admissions and outlined proposed future areas of further research.

## APPENDICES



## Appendix A

### IRB Approval for Study



Cindy Youssef Riyad <[cyoussse@g.clemson.edu](mailto:cyoussse@g.clemson.edu)>

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#### Office of Research Compliance Determination for Dissertation Study

2 messages

Nalinee Patin <[npatin@clemson.edu](mailto:npatin@clemson.edu)>

Thu, May 23, 2019 at 8:34 AM

To: "cyoussse@g.clemson.edu" <[cyoussse@g.clemson.edu](mailto:cyoussse@g.clemson.edu)>

Dear Ms. Riyad,

Based on the information you provided, your study titled "Preparing for Medical School Admissions through Professional Competency Education in a Healthcare Pipeline Program" did not involve human subjects data as defined in the federal regulations governing the protection of human subjects in research, 45 CFR46.102(e).

For the secondary data analysis, the Office of Admissions provided de-identified data for the individuals that met the criteria for your study. During the study, you did not interact with the participants or had access to identifiable private information.

Please contact our office again if there are any changes to this project that might bring it under the purview of the IRB. It is the responsibility of the Office of Research Compliance to determine whether any specific project falls within the definition of research with human subjects, as provided by federal regulations and institutional policy.

All the best,

Nalinee

**Nalinee Patin, CIP**

**IRB Administrator**

**OFFICE OF RESEARCH COMPLIANCE**

Clemson University, Division of Research

[391 College Avenue, Suite 406, Clemson, SC 29631, USA](#)

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[www.clemson.edu/research](http://www.clemson.edu/research)

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## Appendix B

### AAMC Core Competencies and Descriptions for Entering Medical Students

Competency	Description of competency
<b>1) Pre-Professional Competencies (Interpersonal and Intrapersonal)</b>	
<b>a) Service Orientation</b>	demonstrates a desire to help others and sensitivity to others' needs and feelings; demonstrates a desire to alleviate others' distress; recognizes and acts on his/her responsibilities to society; locally, nationally, and globally
<b>b) Social Skills</b>	demonstrates an awareness of others' needs, goals, feelings, and the ways that social and behavioral cues affect peoples' interactions and behaviors; adjusts behaviors appropriately in response to these cues; treats others with respect
<b>c) Cultural Competence</b>	Demonstrates knowledge of socio-cultural factors that affect interactions and behaviors; shows an appreciation and respect for multiple dimensions of diversity; recognizes and acts on the obligation to inform one's own judgment; engages diverse and competing perspectives as a resource for learning, citizenship, and work; recognizes and appropriately addresses bias in themselves and others; interacts effectively with people from diverse backgrounds

Competency	Description of competency
<b>d) Teamwork</b>	works collaboratively with others to achieve shared goals; shares information and knowledge with others and provides feedback; puts team goals ahead of individual goals
<b>e) Oral Communication</b>	effectively conveys information to others using spoken words and sentences; listens effectively; recognizes potential communication barriers and adjusts approach or clarifies information as needed
<b>f) Ethical Responsibility to Self and Others</b>	behaves in an honest and ethical manner; cultivates personal and academic integrity; adheres to ethical principles and follows rules and procedures; resists peer pressure to engage in unethical behavior and encourages others to behave in honest and ethical ways; develops and demonstrates ethical and moral reasoning
<b>g) Reliability and Dependability</b>	consistently fulfills obligations in a timely and satisfactory manner; takes responsibility for personal actions and performance
<b>h) Resilience and Adaptability</b>	demonstrates tolerance of stressful or changing environments or situations and adapts effectively to them; is persistent, even under difficult situations; recovers from setbacks
<b>i) Capacity for Improvement</b>	sets goals for continuous improvement and for learning new concepts and skills; engages in reflective practice for improvement; solicits and responds appropriately to feedback

Competency	Description of competency
<b>2) Thinking and Reasoning Competencies</b>	
<b>a) Critical Thinking</b>	uses logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems
<b>b) Quantitative Reasoning</b>	applies quantitative reasoning and appropriate mathematics to describe or explain phenomena in the natural world
<b>c) Scientific Inquiry</b>	applies knowledge of the scientific process to integrate and synthesize information, solve problems and formulate research questions and hypotheses; is facile in the language of the sciences and uses it to participate in the discourse of science and explain how scientific knowledge is discovered and validated
<b>d) Written Communication</b>	effectively conveys information using written words and sentences
<b>3) Sciences Competencies</b>	
<b>a) Living Systems</b>	applies knowledge and skill in the natural sciences to solve problems related to molecular and macro systems including biomolecules, molecules, cells, and organs
<b>b) Human Behavior</b>	applies knowledge of the self, others, and social systems to solve problems related to the psychological, socio-cultural, and biological factors that influence health and well-being

Note: these descriptions of core competencies are from the Association of American Medical Colleges (AAMC) website titled, *The Core Competencies for Entering Medical Students* (American Association of Medical Colleges, 2019b).

## Appendix C

### Permission from Medical School to Conduct Research Study

The following email was provided to me, granting permission to use admissions materials to conduct this research study.

**Cindy Riyad**

---

**From:** [REDACTED]  
**Sent:** Monday, June 3, 2019 1:53 PM  
**To:** Cindy Riyad  
**Subject:** Dissertation Request

Dear Cindy,

The Office of Admissions approves your request to use data from the 2016-2017 admissions cycle for the purpose of completing your dissertation study, "Preparing for Medical School Admissions through Professional Competency Education in a Healthcare Pipeline Program."

Our office will provide you with de-identified information from the applications of your study participants. We will provide this information electronically, but if you need it in hard copy, please let us know.

[REDACTED]  
Associate Dean for Student Affairs and Admissions  
Associate Professor of Pediatrics

[REDACTED]  
[REDACTED]  
[REDACTED]

## Appendix D

### Fast Facts About the Health System

<b>Mission:</b>	Heal compassionately. Teach innovatively. Improve constantly.
<b>Vision:</b>	Transform health care for the benefit of the people and communities we serve.
<b>Values:</b>	Together we serve with integrity, respect, trust and openness.
<b>History</b>	<p>The Health System first opened its doors in 1912. Over the last 100 years, the organization has evolved from a single free-standing hospital to a highly integrated delivery system and now an academic medical center. In that time, the Health System has become the state's largest not-for-profit healthcare system and an advocate for community healthy living initiatives.</p> <p>The Health System's commitment to medical education has advanced over the years, most notably with the recent opening of the medical school on the main hospital campus. This medical school is focused on transforming healthcare delivery by training physicians to connect with communities, patients, colleagues and technology in a new, more progressive way.</p>

<b>By the Numbers</b>	<b>About the Health System</b>	<b>About Academics and Research</b>
	7 medical campuses	418 medical school students
	6 acute care hospitals	242 resident physicians
	2 specialty hospitals	9 residency programs
	5 long-term care facilities	10 fellowship programs
	9 outpatient facilities	299 research publications
	167 affiliated practice sites	990 research studies reviewed by IRB
	1,537 licensed beds	382 active clinical trials
	80 licensed neonatal intensive care bassinets	24 clinical inventions
		\$19 million in external research funding
<b>Health System Employment</b>	<b>15,941 employees</b> (including 1,159 employed physicians, 4,365 registered nurses, 130 physician assistants, and 975 volunteers)	

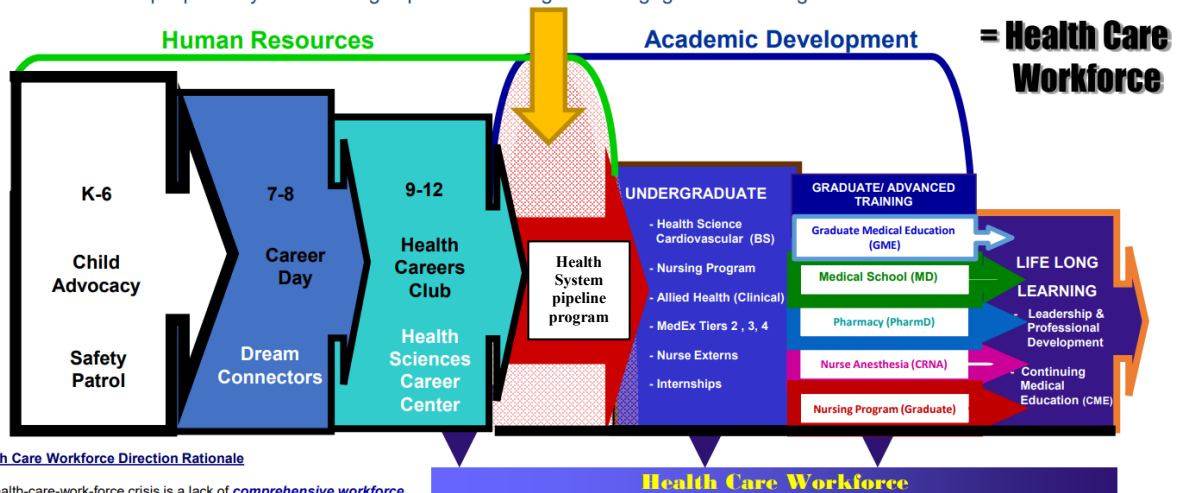
## Appendix E

### Healthcare Workforce Direction Model

# Health Care Workforce Direction

*A Workforce Development Model for Health Care Careers*

**Health Care Workforce Direction Mission:** To develop an innovative, research-based, comprehensive workforce development model that outlines multiple pathways for learning experiences designed to engage and challenge students.



Health Care Workforce Direction Rationale

A crucial factor precipitating the health-care-work-force crisis is a lack of *comprehensive workforce planning* on the parts of academe, government, and the health-care professions. We need *strategic direction* instead of the current piecemeal approach at the national and state levels. The institutions that educate the nation's future health-care professionals must work together to devise *innovative solutions* to the myriad challenges we face – and must finance them, too.

Source: *The Chronicle Review* – November 2, 2007

**Health Care Workforce**

Goal

To establish a system-wide health care workforce development approach to address health professions shortages

## Appendix F

### Overview of the Healthcare Pipeline Program

<b>Mission:</b>	A transformative pipeline program for health care careers
<b>Vision:</b>	Innovative teaching and learning to promote health care careers
<b>Goal:</b>	To equip high school seniors and college undergraduates to make more informed career decisions and prepare for advanced training/education in health care
<b>Demographics</b>	24 colleges and universities represented Average GPA: 3.0 – 4.0 69% female, 31% male Since program inception, over 190 graduates have matriculated into medical school
<b>Enrollment in medical school</b>	Class of 2016: 2 of 54 matriculants (4%) Class of 2017: 8 of 53 matriculants (15%) Class of 2018: 7 of 82 matriculants (8.5%) Class of 2019: 14 of 99 matriculants (14%) Class of 2020: 10 of 103 matriculants (10%) Class of 2021: 17 of 105 matriculants (16%) Class of 2022: 16 of 104 matriculants (15%)
<b>Program Offerings</b>	Workshops (resume writing / application / personal statement / interview skills) University extracurricular clubs Health Careers Night Ambassador Program Affiliations with Historically Black Colleges and Universities (HBCU)



## Appendix G

### Document Analysis Framework and Findings

The purpose of document analysis within this research study was to review foundational documents which have contributed to the medical school, the healthcare pipeline program, and the health system. The summary below illustrates what the document analysis uncovered for these documents.

Document	Purpose	Themes Uncovered
Healthcare Pipeline Program white paper	<ul style="list-style-type: none"> <li>- history of pipeline program</li> <li>- recorded program enhancements over time</li> </ul>	<ul style="list-style-type: none"> <li>- Recurrent theme of <i>careers in healthcare</i> (the purpose of the healthcare pipeline program – not specific towards medical school)</li> <li>- Context for establishment of program to address need for greater healthcare exposure</li> <li>- Projections of program's success over the next 10 years</li> </ul>
Healthcare Pipeline Program accreditation documentation	<ul style="list-style-type: none"> <li>- historical data on program requirements</li> <li>- program requirements and objectives</li> <li>- accredited course names for program completion</li> </ul>	<ul style="list-style-type: none"> <li>- standards for accreditation</li> <li>- objectives of each tier of the pipeline program</li> </ul>
Healthcare Pipeline Program media articles	<ul style="list-style-type: none"> <li>- supplementary research data on program intent and success of program</li> </ul>	<ul style="list-style-type: none"> <li>- student testimonials on efficacy of program</li> <li>- success stories of students who have graduated from the program</li> </ul>
Medical school website	<ul style="list-style-type: none"> <li>- mission/vision/values</li> </ul>	<ul style="list-style-type: none"> <li>- student blog about clinical and</li> </ul>

Document	Purpose	Themes Uncovered
	<ul style="list-style-type: none"> <li>of healthcare pipeline program</li> <li>- percentages of medical school population from the pipeline program</li> </ul>	<ul style="list-style-type: none"> <li>academic experiences provided during the healthcare program</li> </ul>
Medical school admissions data report	<ul style="list-style-type: none"> <li>- verified characteristics and attributes of incoming accepted class of students</li> </ul>	<ul style="list-style-type: none"> <li>- statistical information on students who applied and were accepted</li> <li>- scores on all sub-categories from interview day, related to application materials and interview performance</li> </ul>
AAMC Core Competencies for Entering Medical Students document	<ul style="list-style-type: none"> <li>- historical data on the program</li> <li>- supplementary research data on competencies</li> </ul>	<ul style="list-style-type: none"> <li>- definitions of competencies</li> <li>- examples of students displaying competencies</li> <li>- use of activities and personality characteristics aligned with core competencies</li> </ul>

## Appendix H

Healthcare pipeline program curriculum organized according to

AAMC Core Competencies for Entering Medical Students

<b>Competency</b>	<b>Session Covered (# of Hours)</b>
Service Orientation (6.5hr)	Introduction to Medical Missions (1.5hr) Basic Life Skills (BLS) Training & Certification (4hr) Volunteer & Internship Opportunities (1hr)
Social Skills (159.5hr)	One-on-One Meetings (1.5hr) How to Write a Thank You Note (.5hr) Top Ten Talk (2hr) Mock Admissions Committee (2.5hr) Clinical Observations (90hr) Integrated Practice of Medicine (4hr) EMT Simulations (3hr) AIDET (1hr) Mock Interviews Preparation & Practice (17hr) Effective Presentation Skills (19hr) Team Building Activities (19hr)
Cultural Competence (145hr)	Introduction to Medical Missions (1.5hr) Clinical Observations (90hr) Medical Case Studies (3hr) Integrated Practice of Medicine (4hr) Medical Case Studies (2hr) The Great Debates (15.5hr) Effective Presentation Skills (19hr) The Walk (10hr)

<b>Competency</b>	<b>Session Covered (# of Hours)</b>
Teamwork (82.5hr)	Personal Statement Peer Editing (1hr) Mock Admissions Committee (2.5hr) Basic Life Skills (BLS) Training & Certification (4hr) Integrated Practice of Medicine (4hr) EMT Simulations (3hr) Medical Case Studies (2hr) Mini Research Presentations (3.5hr) The Great Debates (15.5hr) Program Introduction (3hr) Affordable Care Act Research (6hr) Effective Presentation Skills (19hr) Team Building Activities (19hr)
Oral Communication (202hr)	One-on-One Meetings (1.5hr) Personal Statement Peer Editing (1hr) Medical School Admissions Board (1.5hr) Medical Student Panel & Group Discussions (2.5hr) Mock Admissions Committee (2.5hr) Physician Panel (2hr) Basic Life Skills (BLS) Training & Certification (4hr) Clinical Observations (90hr) Medical Case Studies (3hr) Integrated Practice of Medicine (4hr) EMT Simulations (3hr) Medical Case Studies (2hr) Mini Research Presentations (3.5hr) The Great Debates (15.5hr) AIDET (1hr) Mock Interviews Preparation & Practice (17hr) Effective Presentation Skills (19hr) Team Building Activities (19hr) The Walk (10hr)
Ethical Responsibility to Self and Others (76.5hr)	How to Pay for Medical School (1hr) Top Ten Talk (2hr) Life in Healthcare (1hr) The Great Debates (15.5hr) CBT Training and Personal Protection (10hr) AIDET (1hr) Mock Interviews Preparation & Practice (17hr) Effective Presentation Skills (19hr) The Walk (10hr)

<b>Competency</b>	<b>Session Covered (# of Hours)</b>
Reliability and Dependability (174hr)	How to Write a Thank You Note (.5hr) How to Pay for Medical School (1hr) Top Ten Talk (2hr) Life in Healthcare (1hr) Clinical Observations (90hr) Integrated Practice of Medicine (4hr) Mini Research Preparation (3hr) The Great Debates (15.5hr) CBT Training and Personal Protection (10hr) Program Introduction (3hr) Affordable Care Act Research (6hr) Effective Presentation Skills (19hr) Team Building Activities (19hr)
Resilience and Adaptability (181hr)	One-on-One Meetings (1.5hr) Top Ten Talk (2hr) Medical Student Panel & Group Discussions (2.5hr) Mock Admissions Committee (2.5hr) Physician Panel (2hr) Clinical Observations (90hr) The Great Debates (15.5hr) Mock Interviews Preparation & Practice (17hr) Effective Presentation Skills (19hr) Team Building Activities (19hr) The Walk (10hr)

<b>Competency</b>	<b>Session Covered (# of Hours)</b>
Capacity for Improvement (106hr)	One-on-One Meetings (1.5hr) Personal Statement Workshop (2.5hr) AMCAS Workshop (2hr) Personal Statement Peer Editing (1hr) How to Pay for Medical School (1hr) Top Ten Talk (2hr) Medical School Admissions Board (1.5hr) Medical Student Panel & Group Discussions (2.5hr) Mock Admissions Committee (2.5hr) Resume Workshop (1.5hr) Physician Panel (2hr) Basic Life Skills (BLS) Training & Certification (4hr) Medical Student Anatomy Lab (20.5hr) Mini Research Presentations (3.5hr) Program Introduction (3hr) Mock Interviews Preparation & Practice (17hr) Effective Presentation Skills (19hr) Team Building Activities (19hr)
Critical Thinking (207.5hr)	Personal Statement Workshop (2.5hr) AMCAS Workshop (2hr) Medical School Admissions Board (1.5hr) Mock Admissions Committee (2.5hr) Resume Workshop (1.5hr) Career Lecture – Radiology (1.5hr) Clinical Observations (90hr) Medical Student Anatomy Lectures (23hr) Medical Student Anatomy Lab (20.5hr) Medical Case Studies (3hr) Integrated Practice of Medicine (4hr) Genetic Diseases (1.5hr) EMT Simulations (3hr) Infectious Disease Control (1hr) Medical Case Studies (2hr) Introduction to Research (1.5hr) Mini Research Preparation (3hr) The Great Debates (10.5hr) CBT Training and Personal Protection (10hr) Mock Interviews Preparation & Practice (17hr) Affordable Care Act Research (6hr)

<b>Competency</b>	<b>Session Covered (# of Hours)</b>
Quantitative Reasoning (46.5hr)	Medical Student Anatomy Lab (20.5hr) Introduction to Research (1.5hr) Mini Research Preparation (3hr) The Great Debates (15.5hr) Affordable Care Act Research (6hr)
Scientific Inquiry (81.5hr)	Career Lecture – Radiology (1.5hr) SonoSim Simulator Orientation (3hr) Medical Student Anatomy Lectures (23hr) Medical Student Anatomy Lab (20.5hr) Medical Case Studies (3hr) Genetic Diseases (1.5hr) Infectious Disease Control (1hr) Medical Case Studies (2hr) Introduction to Research (1.5hr) Mini Research Preparation (3hr) The Great Debates (15.5hr) Affordable Care Act Research (6hr)
Written Communication (52hr)	Personal Statement Workshop (2.5hr) AMCAS Workshop (2hr) How to Write a Thank You Note (.5hr) Personal Statement Peer Editing (1hr) Resume Workshop (1.5hr) The Great Debates (15.5hr) CBT Training and Personal Protection (10hr) Team Building Activities (19hr)
Living Systems (33.5hr)	SonoSim Simulator Orientation (3hr) Medical Student Anatomy Lectures (23hr) Medical Case Studies (3hr) Genetic Diseases (1.5hr) Infectious Disease Control (1hr) Medical Case Studies (2hr)
Human Behavior (82.5hr)	Life in Healthcare (1hr) Basic Life Skills (BLS) Training & Certification (4hr) SonoSim Simulator Orientation (3hr) Medical Student Anatomy Lectures (23hr) Medical Student Anatomy Lab (20.5hr) Medical Case Studies (3hr) Integrated Practice of Medicine (4hr) Genetic Diseases (1.5hr) Infectious Disease Control (1hr)

<b>Competency</b>	<b>Session Covered (# of Hours)</b>
	Medical Case Studies (2hr)
	Health Risk Assessment Testing (2.5hr)
	Mock Interviews Preparation & Practice (17hr)



## Appendix I

### Descriptive Qualitative Study Protocol

To ensure rigor in my research study, I elected to prepare a study protocol for this research study. The purpose of this study protocol is to ensure I am carrying out standardized procedures for the data I collected on each participant in my research study. I have organized this protocol to provide both broad and specific details regarding the overview of the study, the research procedures, and the case study report.

### Overview of Study

#### Purpose of Research Study

The purpose of this study was to examine the presence of core competencies of entering medical students in the medical school admissions cycle. Despite a growing number of students wishing to be accepted to medical school, there is a staggering number of accepted positions available nationwide (Association of American Medical Colleges, 2019g). Therefore, understanding which characteristics are prominent during the admissions process will be important to students, educators, and researchers, as there continues to be a growing need to educate and produce a strong workforce of trained and qualified physicians.

#### Research Questions

The research question I would like to employ moving forward is the following:

- How are the Association of American Medical Colleges (AAMC)'s Core Competencies for Entering Medical Students displayed in the medical school application process of students who completed a healthcare pipeline program?

## **Conceptual Frameworks Guiding Study**

In order to guide my research effectively, I elected to utilize Sternberg's (1984) Triarchic Theory of Intelligence and the Association of American Medical Colleges (AAMC) Experiences-Attributes-Metrics Model.

## **Research Procedures**

### **Researcher's Role**

Within this research study, my role as the researcher will be to gather collected data from the office of admissions in the medical school. Because the data has already been submitted to the medical school office, I will not need to interact with the participants of my study, because I will be conducting a secondary data analysis over admissions materials.

### **Preparation Steps Needed for Study**

The first step I will complete will be to gain permission to conduct this study from the medical school (and more specifically the medical school admissions office). Additionally, I will seek out information on applying for IRB approval, in order to carry out this study in a professional and ethical manner. I will employ a stratified purposeful sampling and then criterion sampling to those who have applied to the medical school and who have completed the final year of the healthcare pipeline program. Participants will then be selected based on the presence of comments from their multiple mini interviews. Then, I will select participants on the basis of the race and gender statistics of the state in which the healthcare pipeline program is housed.

## **Context of Study**

This research study will be conducted following the medical school admissions process. I will gain access to the data needed for the study through the medical school admissions office. To obtain the data needed for this study, I will gain access to the de-identified data through the admissions office of the medical school. The medical school admissions office will provide all data to me, so interaction with the participants will not be necessary. To interact with the admissions office, I will gain access through the manager of admissions, who has agreed to provide all data without any identification modifiers.

## **Participants**

Participants will be selected according to a stratified purposeful manner, according to my research study criteria. Although the summer healthcare program is comprised of four levels (or tiers) of students, I will focus my study on students who have completed the fourth tier of the program. Students who have completed the fourth tier have indicated this information voluntarily on the medical school application. I will ask the admissions committee to provide participants who have completed the healthcare pipeline program, and who represent the race and gender statistics of the state.

## **Research Study Design**

For this pilot study, I will complete a descriptive qualitative study. To ensure trustworthiness, I will employ member checking at the beginning stages of my research study. This step will ensure that the pipeline program's curriculum data I will organize according to the core competencies are validated by the program leadership. I will also

ensure confirmability in this research study by engaging in self-auditing and reflective memoing during the data analysis process. Finally, I will engaged in triangulation with the diverse sources of data I am using, to vary my sources of data to strengthen my research study. In the table below, I have provided the data sources and their characteristics.

Table 1

*Data Used in Research Study*

<b>Form of Data</b>	<b>Author of Data</b>	<b>Characteristics</b>
<ul style="list-style-type: none"> <li>• Personal Statement</li> </ul>	Applicant	Limited to a maximum of 5,300 characters
<ul style="list-style-type: none"> <li>• Secondary Application</li> </ul>	Applicant	Guided questions crafted by medical school to learn more about applicant
<ul style="list-style-type: none"> <li>• Individual Interviews</li> </ul>	Interviewers	Individual interviews, based on full application and patient-physician situations
<ul style="list-style-type: none"> <li>• Multiple mini interviews (MMIs)</li> </ul>	Interviewers	Scenario-based activities, seeking to observe characteristics of applicant
<ul style="list-style-type: none"> <li>• Letters of recommendation</li> </ul>	Individuals selected by the applicant	Written narrative, submitted by individuals selected by the applicant, to discuss the applicant's characteristics in greater detail, based on personal interaction with candidate

## **Data Analysis**

I will conduct document analysis on historical and reference materials related to the medical school, the healthcare pipeline program, and the health system. The purpose of the document analysis will be to understand the context by which the healthcare pipeline program is presented and discussed. Additionally, I will be looking for whether the medical school and the health system include information in the core competencies within their documents.

For the data analysis in my research study, I will employ framework analysis (Ritchie & Spencer, 1994). Using this five step process, I will begin with familiarizing myself with the data on each of the six participants. Then I will create a coding framework based on the AAMC Core Competencies for Entering Medical Students (Association of American Medical Colleges, 2019b).

I will code the data through the indexing phase. I will first code with the competencies but note areas which are identified in the data as a whole, even if they are not listed in the competencies. When I have completed the indexing phase, I will begin to chart my findings and attempt to understand the presence of the core competencies in the data. I will examine the data by participant but also by the data type. In the final step of framework analysis, I will map the data findings into comprehensive themes that will assist me in understanding the presence of the core competencies in medical school applications.

Throughout the data analysis process, I will undergo reflective memoing. It will be important to document why I am choosing to code data pieces in the way I am, so that

I can use these justifications when I am interpreting and mapping the data. Additionally, I will have a colleague also code the data so that I can compare the codes I have organized in relation to my colleague's choices.

## Appendix J

### Initial Coding Framework

The initial coding framework was based on the Association of American Medical Colleges (AAMC)'s Core Competencies for Entering Medical Students (2019b).

In the initial coding, I coded the data by participant based on my understanding of the following core competencies.

1. Critical Thinking
2. Oral Communication
3. Resilience and Adaptability
4. Reliability and Dependability
5. Social Skills
6. Cultural Competence
7. Capacity for Improvement
8. Other Category (for information which did not fit within the seven core competencies)

## Appendix K

### Final Version of Codebook

I continued to use the AAMC Core Competencies for Entering Medical Students (Association of American Medical Colleges, 2019b). Within the final codebook, I used the explanations provided on each core competency to code the data within the core competencies. These codes are listed below with a black dot next to them.

Based on the data, I added codes which represented additions to the data. These codes are signified below with a hollow circle symbol next to them.

Finally, of note: I added codes which appeared in the data but were not part of the core competencies I was examining. I noted the presence of two competencies which are part of the fifteen core competencies, *Service Orientation* and *Teamwork*. I added these codes to my codebook.

#### **Critical Thinking**

- Use logic and reasoning
- Identify strengths and weaknesses of solutions, conclusions, or approaches to problems
- Lack of critical thinking

#### **Oral Communication**

- Effectively conveys information to others using spoken words and sentences
- Listens effectively
- Recognizes communication barriers
- Clarifies information as needed
- Resilience & Adaptability
- Tolerance of stressful or changing environments or situations
- Adapts effectively to situations
- Persistent, even under difficult situations
- Recovers from setbacks

#### **Reliability & Dependability**

- Fulfills obligations in a timely and satisfactory manner
- Takes responsibility for personal actions and performance



**Social Skills**

- Awareness of others' needs, goals, feelings
- Adjust behavior appropriately to respond to social and behavioral cues
- Treat others with respect
  - Presence of maturity
  - Lack of maturity
  - Positive demeanor
  - Negative demeanor
  - Presence of empathy
  - Lack of empathy

**Cultural Competence**

- Knowledge of socio-cultural factors that affect interactions and behaviors
- Appreciation and respect for diversity dimensions
- Recognizes and acts on obligation to inform one's judgment
- Engages diverse and competing perspectives
- Recognizes and addresses bias in self and others
- Interacts effectively with diverse people

**Capacity for Improvement**

- Sets goals for continuous improvement
- Sets goals for learning new concepts and skills
- Engages in reflective practice for improvement
- Solicits and responds appropriately to feedback

**Service Orientation**

- Leadership in service
- Leadership in paid employment
- Leadership in family

**Teamwork**

- Work collaboratively with others

**Determination**

- Interest in medicine
- Investment of time

**Academic Achievement**

- Academic Courses
- Standardized Tests

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